THE

JOURNAL OF GAS LIGHTING.

PUBLISHED MONTHLY.

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CONTENTS.

	PAGE
Circular to Gas Companies	161
Communicated Articles:—	
Dr. Fyfe on the Illuminating Power of Gas from Pelton Coal	162
Provincial Notes—Stockport Gas Works	163
Correspondence:—	
On the Analysis of Coal Gas, by Lewis Thompson, Esq.	164
Register of New Patents:—	
Booth—Improvements in the Manufacture of Gas	167
Mead—Improvements in Apparatus for Measuring Gas, Water, and other Fluids	168
Dircks—Improvements in the Manufacture of Gas, Gasburners, and in Apparatus for Heating by Gas	168
Legal Intelligence:—	
Middlesex Sessions—Michael Angelo Taylor's Act	169
Miscellaneous:—	
Marylebone Gas Consumers' Company	172
On the Value of various Kinds of Coal for Steam Purposes	174
Report on the Nature and Products of the Process of the Destructive Distillation of Peat	175
Gas Lighting in South America	177
New York	177
Solid Gas	177
Biddle's Chimney-glass Cleaner	177
Philippe Lebon	177
Share List	178
Price Current	180

NOTICE TO AMERICAN READERS.

Complete series of the Journal may be had of Messrs. D. Appleton and Co., 200, Broadway, New York, to whom all subscriptions for the United States, after the 10th of January, 1851, must be paid.

NOTICES.

Subscribers who have not paid their subscriptions in advance are requested to remit 6s. in discharge of the half year now expired, or 11s. for the current year.

The subscription is 10s. per annum if paid in advance, or 12s. on credit, payable in two sums of 6s. each, due in June and December of each year. All subscriptions commence from the 10th of January.

All communications and orders for Advertisements to be addressed to the Editor, 32, Bucklersbury, London.

Back numbers exceeding three months' date will in future be charged double price, unless six or more consecutive numbers are taken at the same time. Nos. 6, 15, 18, and 23 are out of print.

The Editor will be particularly obliged by his friends forwarding to him Notices of all Meetings, Trials, or Appeals which it may be interesting to the Gas World to have reported.

ERRATUM.

In the table of Experiments on Wigan Cannel Gas given at page 142 of the August number, the light of a batswing burner consuming 3 cubic feet of gas per hour is erroneously printed as equal to 578·1 grains of sperm per cubic foot of gas. It should have been 518·1 grains. The equivalent in standard candles is correctly stated at 4·31 candles, so that the erratum will have been at once detected.

Circular to Gas Companies.

The Editor may be consulted on all subjects connected with the supply and manufacture of gas, or the alteration and improvement of gas apparatus, and the construction of new works.

At a time when a reckless and unwholesome spirit of competition threatens to reduce the profits of gas manufacturing below the legitimate returns of fair trading, no great power of language can be needed to induce those interested in this subject to examine carefully into the circumstances of their present unsettled condition, and contrast it with that which the advanced knowledge of the age seems to render not only possible or probable, but even certain. We shall not, therefore, waste time in soliciting the attention of public companies to so important a matter, for it has now become sufficiently evident that, if the manufacture of gas is henceforth to retain the character of a safe and profitable investment for capital, it can only be by the application of fresh knowledge derived from the sound and unerring principles of manufacturing economy. To information of this kind but few individuals ever lend an unwilling ear, more especially in the hour of adversity, so that our comments will no doubt be received, as they are meant, in good part. It is impossible to conceal the fact that gas-making has not progressed during the last twenty years in the same ratio as other manufactures of its class. It is still the same coke and gas making, waste-product neglecting business that it was a quarter of a century ago. No really important alteration or improvement has taken place in it almost ever since its origin. The main features of the manufacture have been indifferently well worked out, but the details are shamefully imperfect. Coke and gas constitute the all in all, whilst the numerous other residuary products are either absolutely thrown away, or, so to say, gratuitously given up to individuals who make fortunes out of the donation. Now, although we have no desire to over-estimate the worth of these waste products, or assert that they alone, if utilized, would turn the balance of profit so as to restore gas dividends to their once flourishing and satisfactory state, yet unquestionably much remains to be done in working these things up into a marketable form, ere the business of the gasmaker can be said to have fallen beyond a reasonable hope of profitable restoration. Gas-making is essentially a chemical manufacture, and not altogether a mechanical one, as it has been too often regarded. Like every other chemical manufacture, therefore, it must depend largely for its success upon the economical application of its waste residue. The word waste, in fact, should never be heard in such manufactories but as a signal for increased exertion, for renewed appeals to genius, and for additional communications with the scientific intelligence of the day. Here, it seems to us, there is room for improvement; and in this spirit we cheerfully set about endeavouring to supply so important an item in the economy of gas-making. To know what can be done in a practical way with these waste products is to render the question of profit or loss no longer doubtful; to know what cannot be done is to possess the power of avoiding unnecessary outlay upon hopeless or impossible schemes and crotchets. On this latter point alone thousands upon thousands have been, and still are, squandered in attempts that had nothing better than the insane folly of a lunatic, or the profligate cunning of a knave, to recommend them. We have assigned to ourselves the task of inquiring into and elucidating this question of waste products, though not without a full conviction of the difficulties inseparable from so complex an investigation. Nevertheless, having had the good fortune to secure the co-operation of a body of gentlemen remarkable alike for scientific and practical knowledge on this subject, we cheerfully commence our labour of reviewing from beginning to end the whole process of gas-making, and shall each month publish our experimental results in the order in which they arise. Analytical investigations will be made upon the different kinds of coal, coke, lime, gas-lime, ammoniacal liquor, tar, and coal gas, both pure and impure; and the modes of analysis pursued in each instance given in plain and simple language, so as to form a kind of gas engineer's "vade mecum." The various products arising from the ashes of coal, the compounds of cyanogen contained in impure gas and gas liquor, the different modes of working up ammoniacal salts, and the materials best adapted to arrest and condense ammonia, will all be treated of in a practical and intelligible manner, and with strict reference to the economical principles of proper manufacture.

The progress of these principles has been remarkably

slow in its diffusion throughout gas works; in proof of which we may point to the fact that, although it is now thirty years since Mr. G. Lowe first drew attention to the circumstance that prussian blue might be obtained from the residue of gas manufactories, yet up to the present moment little or no advantage has been taken of this important discovery, though there is reason to believe that every ton of average Newcastle coal yields at the present market price of prussiate of potash a quantity of cyanogen sufficient to make at least five shillings' worth of this extremely marketable commodity. Whether there are any practical difficulties in the way which interfere with the process of this improvement, and which modern science cannot overcome, is exactly one of those questions that we propose to examine into and answer, for upon the result of such investigations the future fate of gas manufacturing very largely depends. That "vexatâ questio," the illuminating power of coal gas, will also occupy no inconsiderable share of attention; and a series of experiments upon the action of the substances used for condensing olefiant gas, and the other forms of hydro-carbon, will be undertaken, by which a hope may be entertained that the present conflicting results, arrived at by different authorities, will be reconciled to one uniform standard, and, consequently, to each other. In our photometrical inquiries, great care will be used in the investigation of that new field of discovery which distinguishes between quantity and intensity of light. The prevailing foible in the burning of gas at present is to produce intensity of light at the expense of quantity, by which the real illuminative effect, though apparently increased, is actually diminished; whilst the result is eminently calculated, from its great brilliancy and depth of shadow, to injure the organ of sight. In conclusion, we confidently solicit the kindly construction and friendly assistance of our numerous readers in carrying out a work which, after all, has for its real aim no other object than the improvement and success of the manufacture of coal gas throughout Great Britain.

The elaborate report of Sir Robert Kane on the products of the distillation of peat, given in our present number, is a practical illustration of the rapid advance which organic chemistry has made of late years, and of the necessity for a similar examination of coal and its products, if the manufacture of gas is to keep pace with the other branches of manufacture, to the success of which chemical science has so largely contributed.

Communicated Articles.

ON THE ILLUMINATING POWER OF GAS FROM PELTON COAL.

BY ANDREW FYFE, ESQ., M.D., F.R.S.E.,

Professor of Chemistry, University and King's College, Aberdeen.

In my paper on the illuminating power of coal gas, published in the number of the GAS JOURNAL for October, 1849, I gave the illuminating power of the gas from Pelton coal as 2·73 candles per foot, the quantity of gas from a ton of coal being 9746 feet.

In the remarks published by Mr. Barlow, in the number for April, 1851, the value of the gas from the same coal is stated to be equal to 422 lbs. of sperm, while the quantity of gas per ton amounted to 9500 feet. Similar trials were performed by me and reported on in May, 1851. In these the value was equal to 468 grs. of sperm per foot. The gas being the same in quantity as in the first trials, viz., 9746 feet per ton, would make the value of the coal equal to 651 lbs. of sperm.

The discordance in the results of these trials induced Mr. Barlow to repeat his experiments; and, though he employed various kinds of burners, one of them the same that I had generally used, he still arrived at very nearly the same conclusions. He is inclined, therefore, to consider the average value of the ton of Pelton coal as not exceeding 422 lbs. of sperm.

The result of similar trials recorded in Mr. Barlow's paper, and performed by a friend of his, gives a value a little higher than the above, but still far below mine. This remarkable difference made me anxious again to repeat the trials, and, if possible, to find out where lay the error, if any, in my experiments. How far I have succeeded the following statement will show.

It was suggested to me that, as I had been operating with various coals, some of them of high value, perhaps some rich hydro-carbon had lodged in the tubes of the apparatus, and had communicated an additional illuminating power to the Pelton gas. Though I did not think that this was likely, yet it was proper to avoid any error that might arise from it. The apparatus which I had all along used in my different trials, and which had not been in use since February, when those recorded in May were performed, had been left with the retort and pipes open, and, consequently, subject to the action of the atmosphere. On the 5th of July several charges of gas from Pelton coal were passed through it; the last, being the fifth, was kept for trial.

The following are the results:—

EXPERIMENT No. 1 (July 5).

14 lbs. coal gave gas equal to 9636 feet per ton; coke, 9 lbs. 5 oz. Heat *rather lower* than that generally had recourse to at the gas works at Aberdeen.

Time occupied in the Distillation of 7·1-12th feet of Gas. Min.	Feet.
8	7·1
8	7·1
9	7·1
9	7·1
10	7·1
14	7·1
19	7·1
26	7·1
23	2·10
126	59·$\frac{6}{12}$ths.

The illuminating power of the gas was then tried in the usual way with the Bunsen screen. The distance from the candle to the screen was, in some trials, 10 inches; in others, the distance between the candle and gasburner was 100 inches, and the screen was moved till the spot disappeared. The sperm candles consumed 140 grains per hour. The argand was that formerly used, and which I have entitled *Aberdeen Argand* (Winfield's).

Consumpt per Hour.	Candles per Foot.	Grains of Sperm per Foot.	Pounds of Sperm per Ton of Coal.
5·5	2·54		
6·	2·66		
	..		
6·5	2·9		
6·5	3·7		
6·5	3·1		
Average of three best	3·26	456.	628.

EXPERIMENT No. 2 (July 10).

14 lbs. coal gave gas equal to 9636 feet per ton; coke, 9 lbs. 4 oz. Heat *rather higher* than usual.

Time occupied in the Distillation of 7·1 Cubic Feet. Min.	Cubic Feet.
5	7·1
5	7·1
5	7·1
6	7·1
7	7·1
9	7·1
12	7.1
17	7·1
15	2·10
81	59·$\frac{6}{12}$ths.

Consumpt per Hour.	Candles per Foot.	Grains of Sperm per Foot.	Pounds of Sperm per Ton of Coal.
6·5 ft.	2·43		
	..		
7·2	3·43		
7·5	3·6		
Average of two best ..	3·5	490.	674.

EXPERIMENT No. 3 (July 10).

7 lbs. gave gas equal to 10,993 feet per ton; coke, 4 lbs. 9 oz. Heat *very much higher* than usual.

Time occupied in the Distillation of 7·1 Feet. Min.	Feet.
5	7·1
6	7·1
6	7·1
14	7·1
29	6·1
62	34·$\frac{8}{12}$ths.

Consumpt per Hour.	Candles per Foot.	Grains of Sperm per Foot.	Pounds of Sperm per Ton of Coal.
8· ft.	2·		
7·2	2·17		
Average	2·06	291.	457.

EXPERIMENT No. 4 (July 23).

14 lbs. gave gas equal to 9066 feet per ton; coke, 10 lbs. 5 oz. Heat *very much lower* than usual.

GAS LIGHTING

Time occupied in the Distillation of 7·1 Feet. Min.	Feet.
8	7·1
9	7·1
10	7·1
12	7·1
14	7·1
17	7·1
23	7·1
32	7·1
125	56·$\frac{5}{12}$ths.

Consumpt per Hour.	Candles per Foot.	Grains of Sperm per Foot.	Pounds of Sperm per Ton of Coal.
5· ft.	1·8		
	..		
7·2	2·66		
7·2	2·1		
Average of two best ..	2·38	333.	432.

EXPERIMENT No. 5 (July 23).

14 lbs. gave gas equal to 8386 feet per ton; coke, 10 lbs. 7 oz. Heat *very much lower* than usual.

Time occupied in the Distillation of 7·1 Feet. Min.	Feet.
20	7·1
19	7·1
19	7·1
19	7·1
23	7·1
28	7·1
73	7·1
65	2·10
266	52·$\frac{5}{12}$ths.

Consumpt per Hour.	Candles per Foot.	Grains of Sperm per Foot.	Pounds of Sperm per Ton of Coal.
7· ft.	2·52		
	..		
6·5	2·9		
6·5	2·8		
6·5	3·		
6·5	3·4		
Average of two best ..	3·	420.	502.

In this last case a considerable quantity of thick tar was formed in the retort after the distillation was finished, which, by the application of heat, lost ten per cent. of its weight.

The results of these trials not only prove that in my previous statements I am correct with regard to the illuminating power of the gas from Pelton coal, but they seem to point to the cause of the remarkable difference between Mr. Barlow's results and mine. It will be observed that in these trials, when the heat at which the gas was driven off was much *above* or much *below* that at which we are accustomed to work the retorts in Scotland, the gas was either of inferior quality or small in quantity; consequently giving a lower value to the coal. Thus, in the above trials, as compared with one another, the results are:—

	lbs. of sperm.	Average lbs. of sperm.			
Expt. 4th....	431	100	463	100	Heat very low.
„ 3rd ...	457	106			„ very high.
„ 5th....	502	116			„ very low.
„ 1st....	628	145	651	140	„ a little lower.
„ 2nd ...	678	156			„ a little higher than standard.

Comparing my last results with those of Mr. Barlow, they are as 422 lbs. of sperm to 651; that is, as 100 to 154.

I am told by the person alluded to by Mr. Barlow, and who witnessed some of his trials, that the heat at which the gas is distilled in London is *far below* that at which the retorts are generally worked in Scotland; hence, in all probability, the cause of the inferiority of Mr. Barlow's gas, and the consequent inferior value assigned to the coal. It has often occurred to me that in England the heat at which the retorts are worked is too low; no doubt there is an object in view in this, viz., the superiority of the coke obtained; but this ought not to interfere in the manufacture, where the sole object ought to be to supply the public with good gas. I would, therefore, strongly recommend that in working the retorts a higher heat should be resorted to. I am not prepared to state the exact temperature; that professed in Scotland is what is generally called a full red heat.

Another circumstance that may likewise affect the quality of the gas is the length of time occupied in the distillation. In England it is generally from six to seven hours; at Aberdeen the time does not exceed four hours.

[The respected writer of the above remarks has, we think, omitted to take into consideration the effect due to increasing consumpts of gas in argand burners. It is an established fact, which will not now admit of being overlooked, that the illuminating power of all gas, when so consumed, increases progressively (in a ratio not yet accurately determined) as the quantity consumed is augmented. All comparative experiments on gas extracted from the same materials should consequently be made on equal consumpts. Upon this principle the results of these experiments would be more accurately stated as follows:—

EXPERIMENT No. 1.—Product 9636 feet per ton.

Consumpt per Hour.	Candles per Foot.	Grains of Sperm per Foot.	Pounds of Sperm per Ton of Coal.
5·5	2·54	355·	488·
6·	2·66	372·	512·
6·5	2·79		
6·5	3·7		
6·5	3·1		
Mean ..	3·2	448·	616·

EXPERIMENT No. 2.—Product 9636 feet per ton.

Consumpt per Hour.	Candles per Foot.	Grains of Sperm per Foot.	Pounds of Sperm per Ton of Coal.
6·5	2·43	340·	468·
7·2	3·43	480·	660·
7·5	3·6	504·	695·

EXPERIMENT No. 3.—Product 10,993 feet per ton.

Consumpt per Hour.	Candles per Foot.	Grains of Sperm per Foot.	Pounds of Sperm per Ton of Coal.
7·2	2·17	303·	475·
8·	2·	280·	439·

EXPERIMENT No. 4.—Product 9066 feet per ton.

Consumpt per Hour.	Candles per Foot.	Grains of Sperm per Foot.	Pounds of Sperm per Ton of Coal.
5·	1·8	2·52	326·
7·2	2·66		
7·2	2 1		
Mean ..	2·38	3·33	431·

EXPERIMENT No. 5.—Product 8636 feet per ton.

Consumpt per Hour.	Candles per Foot.	Grains of Sperm per Foot.	Pounds of Spern per Ton of Coal.
6·5	2·9	..	..
6·5	2·8	..	..
6·5	3·	..	..
6·5	3·4	..	..
		..	..
Mean	3·03	424·	507·
7·0	2·52	352·	421·

The classification of the whole of the experiments according to consumpt will give the following results:—

Experiment.	Consumpt.	1 Foot equal to Standard Candles.	1 Foot equal to Grains of Sperm.	Product of Gas per Ton.	Gas from One Ton equal to lbs. of Sperm.	Observations on Temperature.
No. 4.	5·	1·8	252	9,066	326	Low heat.
No. 1.	5·5	2·54	355	9,636	488	Moderate heat.
No. 1.	6·	2·66	372	9,636	512	Ditto.
No. 1.	6·5	3·2	448	9,636	616	Ditto.
No. 2.	6·5	2·43	340	9,636	468	Ditto.
No. 5.	6·5	3·03	424	8,386	507	Very low heat.
	Mean	2·88	404		503	
No. 5.	7·	2·52	352	8,386	421	Ditto.
No. 2.	7·2	3·43	480	9,636	660	Moderate heat.
No. 3.	7·2	2·17	303	10,993	475	High heat.
No. 4.	7·2	2·38	333	9,066	431	Low heat.
	Mean	2·66	372		522	
No. 2.	7·5	3·6	504	9,636	695	Moderate heat.
No. 3.	8·	2·	280	10,993	439	High heat.

It will be seen that, with a consumpt of five feet per hour, a lower value is given to Pelton coal than in Mr. Barlow's experiments, though with greater consumpts it exceeds his, as might be expected.—ED. J. of G. L.]

STOCKPORT BOROUGH GAS WORKS.

The price of gas in Stockport during the period over which the annexed accounts extend was 6s. per 1000 feet, subject to the following discounts:—

When the annual consumption

was under	£20		No discount.
„ „	if 20, and under	£30,	2½ per cent.
„ „	30 „	80,	5 „
„ „	80 „	130,	10 „
„ „	130 „	180,	15 „
„ „	180 „	250,	20 „
„ „	250 and upwards,		25 „

3d. per 1000 feet allowed to parties finding their own gasholders.

Since the 1st of January, 1851, the price has been reduced to 5s. per 1000 feet, subject to the undermentioned discounts on yearly rentals:—

Above	£7, and under	£20	. .	2½ per cent.
„	20 „	40	. .	5 „
„	40 „	70	. .	7½ „
„	70 „	100	. .	10 „
„	100 „	130	. .	12½ „
„	130 „	180	. .	15 „
„	180 „	230	. .	17½ „
„	230 and upwards		. .	20 „

Correspondence.

ON THE ANALYSIS OF COAL GAS.

Sir,—Thoroughly convinced of the great benefit which gas chemical engineering must ultimately derive from the aid of science, I remark with extreme regret a disposition on the part of some chemical writers to obscure this beautiful study, by the employment of a vague, indefinite, and even inaccurate style of describing the manipulatory minutiæ of processes which they recommend to the consideration of individuals engaged in the manufacture of gas. This conduct is highly reprehensible, since, in writing on matters of science for the instruction of gas engineers, it should constantly be borne in mind that these persons as a body are but imperfect chemists, otherwise, indeed, the instruction in question would be unnecessary. Hence, if it is really desired to communicate useful knowledge to such individuals, the greatest care ought to be taken, not only that the instructions are rigorously correct and capable of easy comprehension by professed chemists, but, moreover, that they are brought within the ordinary educational scope of those for whose especial benefit they are intended. Now, it strikes me that the process described in a late number of your valuable journal by Dr. Frankland and Mr. John Leigh, for the analysis of gas, is totally at variance with both the above indispensable conditions; of course I take for granted, "in limine," that the process alluded to is meant for the practical instruction of those engaged in the manufacture of gas. Indeed, I feel confident on this point from the existence of an advertisement upon the face of your Journal of the same date as the communication, and which would otherwise be open to an unpleasant construction. I cannot, however, and will not, believe that the analytical results so elaborately detailed by these gentlemen in the body of the Journal have any professional connection whatever with the advertisement on the outside. Clearly not; they never could be "meant for show, like nest eggs, to make clients lay;" nor yet have they a common origin with that vulgar device which places a placard "weighed from the sample" upon a heap of currants in a grocer's shop window. No, no; nothing of the kind. Dr. Frankland and Mr. Leigh had no eye to a business side-wind in their communication; and, therefore, I am warranted in regarding it as a donation meant for and given to the gas world at large; in fact, a modicum of the increasing knowledge of the age. Viewed in this light, I must allude to the regret I feel at being compelled to censure its again shortcomings," and condemn its inaccuracies. In fact, taken as a whole, the process described is incomprehensible and impracticable, not only to a well-informed gas engineer, but even to a thorough practical chemist. Thus, in the first place, no instructions are given for the removal of the aqueous vapour from the gas previous to analysis, though, in consequence of the subsequent treatment by sulphuric acid, all the moisture contained in the portion examined must come to be estimated as olefiant gas. And, indeed, from the language employed by Dr. Frankland, such seems to have been actually the case. "The specimens of gas," says he, "were drawn from the holder on the following morning, in order

STOCKPORT BOROUGH GAS WORKS.—THE ANNUAL ACCOUNT OF INCOME AND EXPENDITURE FOR 1848.

Dr. RECEIPTS. *Cr.* PAYMENTS.

December 31st, 1848.	£ s. d.	£ s. d.
To Cash received for Gas	5840 19 8	
Cash received for lighting public lamps	1892 2 0	
Cash received for coke	140 17 10	
Cash received for tar	77 17 0	
Cash received for meters, fittings, &c.	243 19 9	
Cash received from the council for mains	202 10 0	
		8398 6 3
Cash received from the treasurer		3697 4 2
		12,095 10 5

December 31st, 1848.	£ s. d.	£ s. d.
By Cash to treasurer, January 1st.		4003 2 10
Gas Department.		
Wages	725 15 7	
Oil, &c.	12 1 0	
Lime	121 14 8	
Cannel	2304 18 0	
Carriage of ditto	771 3 6	
		3935 12 9
Maintenance of Works.		
Wages	182 5 7	
Stationery	6 2 6	
Brickwork for retorts	231 4 0	
Castings for ditto	248 8 9	
Iron and ironmongery	34 12 0	
Joiners' work	6 16 6	
Plumbers' work	8 7 10	
Brass taps	23 0 0	
Sundry accounts	79 6 4	
		820 3 6
Lamp Department.		
Wages	275 5 6	
Oil, &c.	11 12 6	
Burners	7 8 0	
Repairs	41 18 4	
		336 4 4
Rents, Rates, and Taxes.		
Chief rents	86 15 5	
Poor rates	161 7 9	
Property tax	61 15 6	
		309 18 8
Meters		334 7 0
Salaries		252 10 0
Council, eighteen months' interest due on mortgage, less income tax		1582 19 0
Banker's interest and commission		206 12 8
T. Steel, for cash not paid over to tradesmen, as follows:—		
Hickman and Co.	47 9 0	
Clayton and Brooke	48 10 0	
Newton, Chambers, and Co.	25 16 0	
John Robinson	5 2 5	
		126 17 5
Extensions.		
New mains	56 7 0	
Service-pipes	42 9 0	
Wages laying ditto	82 12 9	
Paving mains	4 15 0	
Lead pipes, joiners' work, &c.	0 18 6	
		187 2 3
		12,095 10 5

GENERAL STOCK.

Liabilities.

December 31st, 1848.	£ s. d.	£ s. d.
To council for amount unpaid of original mortgage debt		26,700 0 0
Tradesmen's accounts owing for materials, &c.	4825 12 5	
February 5th, 1849.		
To treasurer, owing to him	3697 4 2	
		8,522 16 7
		35,222 16 7

Assets.

December 31st, 1848.	£ s. d.	£ s. d.
By Cost of works to December 31, 1847	35,883 13 4	
Extension, 1848	187 2 3	
	36,070 15 7	
Abatement for amount received from council	202 10 0	
Wear and tear at 3½ per cent. per annum from 1839	8,395 5 4	
		27,513 0 3
Stock of working materials		620 9 1
Debts due for gas, meters, tar, coke, &c.:—		
Good	3,725 19 9	
Doubtful	138 13 11	
		3,864 6 8
The late Mr. Steel's sureties		614 0 2
		32,641 16 2
Balance against the works		2,581 0 5
		35,222 16 7

to ensure a perfect mixture and a fair sample. I have made the analysis of *these* specimens with great care, and in all cases over mercury." Yet, in spite of this great care, the analytical results give no indication of the presence of water, though the specimens from the holder must have been saturated with aqueous vapour to the extent of at least 2 per cent. of their weight. Now, either this vapour was removed previous to analysis or it was not. If it was removed, then an important step in the analysis is omitted; if it was not removed, why does it not figure amongst the products of the analysis? Mr. Leigh is a little more explicit on the water question, though, as we shall presently see, at the expense of his credit for accuracy. Dr. Frankland next informs us that the "only method by which an accurate estimate of olefiant gas can be obtained is by strongly fuming sulphuric acid." But, independently of its condensing aqueous vapour, this substance precipitates every kind of volatile hydro-carbon, and is consequently anything but accurate even as an indicator of the light-giving power of gas, unless, indeed, all forms of condensible hydro-carbon had a luminous property exactly equal to that of olefiant gas, which they most assuredly have not. Hence the olefiant gas of Dr. Frankland must not be regarded as the olefiant gas of other chemists, but a very questionable mixture in which there may be, after all, not one atom of olefiant gas. Mr. Leigh has evidently a misgiving about this olefiant gas, and therefore he terms

THE ANNUAL ACCOUNT OF INCOME AND EXPENDITURE FOR 1849.

Dr.	Total Receipts. £ s. d.
To Cash received for gas	8134 9 10
Cash received for lighting public offices, lamps, &c.	1317 16 0
Cash received for coke and tar	520 8 9
Cash received for meters and fittings	513 16 9
Debt due from the late Mr. Steel's executors	300 0 0
Cash received from treasurer	6341 1 9
	17,127 12 4

Cr.	£ s. d.	Total Payments. £ s. d.
By Cash due to treasurer		3697 4 2
Gas Department.		
Expenses of making and selling gas, stokers, labourage, and all expenses, including salaries	1414 6 0	
Oil, rope, yarn, woodwork, ironmongery, &c.	103 14 1	
Lime	187 14 2	
Cannel coal, &c., 1848	2137 2 2	
Ditto, 1849	2152 10 1	
Carriage of cannel, 1848	114 15 10	
Ditto, 1849	63 5 10	
Tonnage of ditto, 1848	19 11 2	
Ditto, 1849	131 6 8	
		6924 6 0
Lamp Department.		
Expenses of lighting and keeping the public lamps in repair:—		
Wages	207 13 4	
Oil, cotton, &c.	7 18 8	
Burners		
Repairs	50 13 9	
		266 5 9
Maintenance of Works.		
Wages	99 0 10	
Stationery	16 5 2	
Ditto, 1848	59 19 4	
Brick and stone work	90 0 0	
Ditto, 1848	213 4 10	
Castings	120 0 0	
Ditto, 1848	160 0 0	
Iron and ironmongery	115 19 6	
Joiners' work	104 18 2	
Plumbers' work	19 10 0	
Painters' work	41 6 11	
Sundry accounts	65 1 27	
Ditto, 1848	117 11 0	
		1223 8 10
Rents, Taxes, and Rates.		
Chief and other rents	79 17 1	
Ditto, 1848	123 12 11	
Rates	173 13 10	
Ditto, 1848	2 19 6	
		380 3 4
Meters.		
Wages	85 14 3	
Cost of meters	72 15 6	
Ditto, 1848	212 10 9	
Fittings	18 10 3	
Ditto, 1848	62 1 2	
Salaries	3 16 8	
Boats	40 0 0	
		495 8 7
Interest.		
Council of the borough on mortgage, less income-tax	1055 6 0	
Banker's interest and commission	249 4 7	
		1304 10 7
Extension of Mains.		
Wages	77 10 0	
New mains	296 0 0	
Ditto, 1848	154 7 7	
Service-pipes	40 0 0	
Ditto, 1848	48 15 8	
Wages laying ditto	90 16 0	
Paving after mains	0 16 0	
Joiners' work £58 9 4	27 10 6	
Ditto, 1848	56 1 0	
		791 16 9
Heaton Norris Extension.		
Wages	406 16 0	
Lime	25 13 4	
Castings	278 4 9	
Ironwork and ironmongery	254 12 0	
Bricks	232 11 6	
Brickwork	134 9 6	
Fire-bricks and fire-clay	75 7 6	
Joiners' and plumbers' work	32 0 0	
Slate and slating	89 4 0	
Boundary wall	290 0 0	
Flags and stonework	90 8 7	
Excavating	100 17 3	
Sand	0 9 0	
Carriage of retorts, &c.	30 16 9	
Ardwick lime	12 18 2	
		2044 8 4
		17,127 12 4

LIABILITIES AND ASSETS ON THE 31ST OF DECEMBER, 1849.

Liabilities.	£ s. d.	£ s. d.
Council for amount of original mortgage debt		26,700 0 0
Tradesmen's accounts owing for materials	2853 17 1	
Disputed accounts	804 10 0	
Balance due to treasurer	6341 1 9	
	9999 8 10	
		36,699 8 10
Balance in favour of the works		274 11 10
		36,974 0 8

Assets.	£ s. d.	£ s. d.
Value of works, 1st January, 1849	27,543 0 3	
Depreciation, at 3½ per cent.	964 0 0	
	26,579 0 3	
Amount expended on account of repairs	830 19 11	
		27,410 0 2
Extension of mains in 1849		588 16 5
Heaton-lane extension		2,728 13 6
Stock of working materials		829 3 3
Debts due for gas, meters, coke, tar, &c.		5,103 7 4
Due from the late Thomas Steel's sureties		314 0 0
		36,974 0 8

the matters condensible by sulphuric acid "olefiant gas and illuminating hydro-carbons." But then Mr. Leigh is altogether incomprehensible when he endeavours to inform us how he effects this condensation. "For many years," says he, "I have employed the sulphuric acid recommended by Bunsen, using, however, the *perfectly* anhydrous acid obtained by distilling the fuming acid of Nordhausen." Now, this acid, as all the world knows, is a solid substance of a crystalline character; yet Mr. Leigh continues to say, "I remove the olefiant gas and associated carbo-hydrogen by a bullet of coke *saturated* with anhydrous sulphuric acid"—an expression which, as applied to these two bodies, is equivalent to saying that a sovereign may be saturated by a shilling, or a brick-bat by ten-a-penny nails. As a chemist, I confess my utter inability even to guess at Mr. Leigh's "modus operandi" in this instance; and how, therefore, gas engineers are to benefit by reading such a description is almost as difficult of comprehension as the description itself. Mr. Leigh, no doubt, has a mode of using his perfectly anhydrous acid; but surely it admits of a better

THE ANNUAL ACCOUNT OF INCOME AND EXPENDITURE FOR 1850.

Dr.

RECEIPTS.	£ s. d.	£ s. d.
To Cash received for gas rents		9432 1 7
Cash received for public lamps		1354 0 9
Cash received for meters and fittings		655 11 3
Cash received for coke	479 11 3	
Cash received for tar, and spent lime	194 4 4	
		673 15 7
Cash for boat-hire		2 8 0
Cash from Thomas Steel's sureties, per Bruncker and Co., for boats		40 0 0
Cash from Bruncker and Co. for repairs of boats, as per account of expenditure, 1849		40 0 0
		12,197 17 2
Cash received from treasurer		7692 7 2

Cr.

PAYMENTS.	£ s. d.	£ s. d.
By Cash due to treasurer		6341 1 9
Gas Department.		
Wages to stokers and labourers, including salaries	1558 16 1	
Cannel, coal, &c.	3275 7 0	
Cartage of cannel	171 18 3	
Lime	153 3 3	
Oil, &c.	17 13 9	
Yarn, ropes, &c.	14 12 0	
Ironmongery	20 4 0	
Wheelwrights' and joiners' work	9 7 0	
Sundry petty payments	78 9 8	
		5299 11 0
Lamp Department.		
Wages for lighting and repairs	222 5 6	
Painting and glazing	29 13 5	
Oil, &c.	10 2 0	
Brazing, tubing, and tinwork	36 14 6	
Joiners' work	9 18 9	
Sundry small payments	3 19 3	
Burners	9 3 6	
		321 16 11
Rents, Rates, and Taxes.		
Chief and other rents	136 17 4	
Rates and taxes	219 16 9	
		356 14 1
Meters and Fittings.		
Meters and fittings	505 2 5	
Lead pipes	153 19 0	
Wages for repairing tenants' meters	84 11 6	
		743 12 11
Interest.		
Council of the borough, interest on the mortgage debt on works, less income tax	1095 4 0	
Banker's interest and commission	372 16 9	
		1468 0 9
Stationery		64 18 8
Maintenance of the Works.		
Wages	409 8 3	
Repairs of retorts, brickwork, &c.	52 3 9	
New retorts for repairs	100 8 0	
Iron and ironmongery	118 15 4	
Joiners' work	60 15 11	
Braziers' work	12 3 11	
Leadwork	3 5 0	
Stonework	3 0 8	
Yarn and ropes	2 16 0	
Oil, &c.	3 14 6	
Petty payments	11 16 10	
		778 8 2
Extensions of Offices.		
Brickwork, stone and joiners' work, plasterers, and painters	59 17 6	
Ironmongery	8 6 5	
		68 3 11
Heaton Norris Extensions.		
Wages	518 8 6	
Brick and stone work	978 8 1	
Iron castings	1921 12 3	
Timber and joiners' work	87 10 6	
Valves and meter taps	42 9 6	
White and red lead	11 11 0	
Ropes, yarn, &c.	15 9 9	
Sundry small payments	4 19 9	
Total payments	3580 9 4	
Payments for outlay in 1849		684 5 2
Payments for outlay in 1850		2896 4 2
Extensions of Mains.		
Wages	212 13 6	
Cast-iron mains	651 15 5	
Total payments	864 8 11	
Payments for outlay in 1849		56 3 11
Payments for outlay in 1850		808 5 0
Edward Dooley's account overpaid		2 17 11
		19,890 4 4

LIABILITIES AND ASSETS ON THE 31ST OF DECEMBER, 1850.

Liabilities.	£ s. d.	£ s. d.
To Council of the borough for amount of original mortgage debt		26,700 0 0
Tradesmen's accounts owing for materials for gas making, &c.	1403 2 4	
Tradesmen's accounts owing for materials at Heaton Norris	803 11 4	
Tradesmen's accounts owing for the extensions of mains	190 14 2	
Tradesmen's disputed accounts	806 12 2	
		3204 0 0
Treasurer, balance due to him		7692 7 2
		37,596 7 2
Balance in favour of the works		1033 9 6
		38,629 19 8

Assets.	£ s. d.	£ s. d.
By value of the works on the 1st of January, 1850		30,727 10 1
Depreciation, at 3½ per cent.	1075 9 3	
Amount expended on maintenance of works	830 19 11	
		1906 9 2
		28,821 0 11
Extension of offices at Millgate		68 3 11
Extensions, Heaton Norris works, as per cash payments	2896 4 2	
Extensions, ditto, ditto, tradesmen's accounts, as per contra	803 11 4	
		3699 15 6
Extensions of mains, as per cash payments	808 5 0	
Ditto tradesmen's accounts, as per contra	190 14 2	
		998 19 2
Stock of working materials		378 19 9
Debts due for gas	4214 9 0	
Ditto meters and fittings	109 7 4	
Ditto coke and tar	62 3 2	
		4385 19 6
Debts due from the late Mr. Steel's sureties		274 0 0
Ditto on Edward Dooley's account overpaid		2 17 11
		£38,629 19 8

explanation than this. For my part I cannot see what the bullet of coke has to do in the matter at all; and it would have been quite as correct to say that the acid was to be saturated by the coke as the coke by the acid. Having, however, removed the olefiant gas and associated carbo-hydrogen, Mr. Leigh now tells us how he removes the oxygen, or rather what he employs to remove the oxygen, for the description is again obscure. "Any oxygen in the gas," says he, "may be removed by a bullet of phosphorus or by a solution of pyrogallic acid." Now, as regards phosphorus I can only say that in my hands it has entirely failed to remove oxygen from coal gas, or from light carburetted hydrogen; for both of these compounds seem to impair or destroy the affinity of phosphorus for oxygen at ordinary temperatures. In respect to a solution of pyrogallic acid I have had no experience, nor was I aware that it would remove oxygen at all. I know, of course, that pyrogallic acid dissolved in a strong solution of caustic potash has a limited power of this kind; but, irrespective of its very questionable efficacy in the instance chosen, Mr. Leigh cannot mean by the expression, "a solution of pyrogallic acid," to convey to the mind of a gas engineer, nor, indeed, to any one else, the idea that he uses the pyrogallate of potash with an excess of potash solution for the purpose of removing oxygen from coal gas. This would be an explanation "obscurum per obscurius." Again, Mr. Leigh tells us that, in operating, he "first explodes a quantity of the gas with a *large excess* of oxygen, so as to *avoid* the formation of nitric acid." But this is the very way to ensure the formation of nitric acid, if any nitrogen be present in the gas. Mr. Leigh should have said, "I explode a quantity of the gas with the least possible excess of oxygen, so as to diminish the risk of forming nitric acid during the explosion." With all this obvious inaccuracy and carelessness there is, nevertheless, an assumption of excessive exactitude in manipulation which contrasts painfully with the general details. Thus, we are told that "the complete analysis of coal gas requires great care, and is not to be accomplished by persons unaccustomed to analytical processes; that the instruments also require great care, and so on; that constant references are needed to standard barometers and thermometers; that the 'meniscus,' or cup-shaped depression seen on the surface of mercury standing in a tube, must even be accurately ascertained, and a telescope or sliding mirror used in reading off quantities, &c." Now, although I am very far indeed from admitting that a knowledge of the exact chemical composition of coal gas affords any really useful information as to its photogenic capabilities, yet, in a manufacturing point of view, this may prove highly advantageous, as demonstrating the kind of differences induced by variations in the mode of manufacture; consequently, this branch of study is very commendable in gas engineers, though the above recital of difficulties might serve as a "wet blanket" to extinguish the ardour even of a Davy. I would, nevertheless, advise all those desirous of acquiring the power of analyzing coal gas to take these plusquam-perfect particulars of Mr. Leigh "cum grano salis," and remember that there are individuals who assay gold and silver alloys to the $\frac{1}{300}$th of a grain, and who are yet totally "unaccustomed to analytical processes" of any other kind. The analysis of gas, like the assaying of gold, may, therefore, be conducted by men who are not perfect analytical chemists, as a tooth may be drawn by an operator who would shrink from cutting off a leg or arm. If Mr. Leigh's great care and accuracy be worthy of imitation, we should find it in his results; and hence I will proceed to examine the few he has given us by the only rules which are capable of enabling us to judge of their correctness. First, it would appear that Mr. Leigh employs hydrate of potassa to remove carbonic acid and moisture from the gas under analysis; these compounds are, therefore, classed together in the results of No. 1 and No. 2. Now, from the experiments of Saussure and those of Clement Desormes, as well as from the elasticity of aqueous vapour, we know that all gases standing over water at 60 degs. Fahr. and 30 inches of the barometer take up the same quantity of moisture; that is, they expand from 100 cubic inches of dry to 101·75 inches of moist gas, or have a per-centage composition of 98·28 of gas and 1·72 of aqueous vapour. Consequently, as Mr. Leigh gives us both this aqueous vapour and any carbonic acid the gas may happen to contain, the total should exceed 1·72 per cent.; but in No. 1 there is only 1·53 per cent., and in No. 2, 1·40 per cent., of these substances combined, whilst the water alone could not be less than 1·72 per cent., as we have seen. Here, then, is an error somewhere. Again, in giving the analysis of London gas from Newcastle coal, Mr. Leigh states as its composition:—

Olefiant gas, &c. . . .	3·83	weighing	1·13 grs.
Oxygen	·46	do.	·15
Nitrogen	1·61	do.	·47
Hydrogen	52·83	do.	1·11
Light carburetted hydrogen	37·63	do.	6·39
Carbonic oxide	3·64	do.	1·08
Consequently cubic inches 100		weigh	10·33 grs.

which, estimating 100 cubic inches of atmospheric air at no more than 30·5 grs., gives ·338 for the specific gravity of London gas made from Newcastle coal!* a result concerning which I will not offer a single word of comment, lest I might interfere with its full effect upon the risible muscles of your practical readers.

London, Sept. 6, 1851. LEWIS THOMPSON.

* Tested in this way, all the analyses are wrong. Thus, the purified hydro-carbon gas of Dr. Frankland had a specific gravity of ·5911, but his analysis gives only ·4590; and the rest are equally obnoxious to "Cocker."

Register of New Patents.

GEORGE ROBINS BOOTH, of London, engineer, for "*improvements in the manufacture of gas.*" Patent dated Nov. 12, 1850.

These improvements refer to the manufacture of gas from oil, tar, or other resinous or fatty matters, which, hitherto, from difficulties, has never been successfully accomplished. This plan of manufacture is also particularly calculated for situations where a great supply of gas is not required, which would be incompatible with a plant required for the manufacture of ordinary coal gas. For this reason it is adapted for single establishments in such isolated positions where the expense of a main would render the conveyance of gas impracticable. This apparatus consists of a stove or furnace, in which the retort is placed, with a pipe leading from the retort, by which the gas is carried off, and an oil-cistern, by which the supply of oil is maintained for the retort; a vessel containing pumicestone or other analogous substance is placed contiguous, through which the gas permeates, passing thence by a pipe to a vessel containing water, into which the pipe dips. From the upper part of the vessel a pipe conducts the gas to a gas-boiler for consumption. The fireplace has a covering of firebrick material, having an aperture in the centre, through which the heat passes to the retort, which is suspended from the top by the neck. The space containing the retort is lined with firebrick, and again surrounded with powdered coke or charcoal, and the whole encased within a metal casing. Passages are formed on either side of the retort, with which pipes are in connection; these branch off from a main pipe leading to the oil-cistern by which the supply is maintained to the retort. Index-taps are provided at each orifice, by which the supply is regulated to the condition of the retort. The fire having brought the retort to a cherry red, the oil-taps may be turned on, by which the oil will be distributed on the serrated sides and bottom of the retort, by contact with which it is generated into gas. Should the oil at all abate the heat of the retort the supply must be reduced, so as to maintain that temperature. The gas thus generated passes over, as before described, through a pipe to the coke or pumicestone vessel, where any oil carried over is deposited in the bottom of that vessel. The pumicestone is supported on a grating, through which the gas has free passage, and, ascending up through the pumicestone, passes over to the vessel before mentioned. The oil-vessel should contain about 4½ gallons, and at each time of filling that cistern the residual oil in the bottom of the vessel containing the pumicestone is to be drawn off in the following manner, before turning on the fresh supply of oil:—The tap from the oil-cistern is turned off, and the tap at the bottom of the other vessel turned on, when the oil contained in that vessel passes by a pipe into the retort by the regular emission apertures, where it is converted into gas. A residuum will now be formed in the retort, which must be removed before further operation. For this purpose an opening is provided at the bottom of the retort; this is usually stopped by a plug. Another opening also exists at some other convenient part of the pipe. This opening has a long tube affixed to it, to act as a chimney. By opening both these passages air will be allowed to enter the bottom of the retort, which, being at a red heat, will induce combustion of the carbon deposited in the retort, which will pass off in a gaseous form through the vent-chimney. This will also burn out the soot in the pipe and globes therein, rendering the whole free and clean, and adapted for further operations. A chimney for the passage of the products of combustion is a necessary adjunct to the furnace.

The claims are:—

First. For the use of any number of feeders, for the supply of oil for one retort, although the patentee states that he does not employ more than one for small retorts.

Secondly. The use of an airhole at the bottom of the retort, as described, which is also occasionally used to draw any matter from the retort, as usually practised.

Thirdly. The means of burning out the soot in the retort and pipe, by means of an airhole and vent, situated in some convenient part of the gas apparatus.

Fourthly. The order of the before-described process, in which the return-pipe, being opened, carries back the oil deposited in the cistern by the first distillation; this residual oil being made to flow upon the soot or carbon deposited in the retort during that process, until the said carbon is dissipated and made into a gaseous form with the said oil, whenever a supply of oil is poured into the oil-cistern. The above operation must be performed, and all this residual oil wrought off, before the fresh supply from the oil-cistern is turned on. This process is claimed as an entirely new feature in gas apparatus.

Fifthly. The proportional sizes of the numerous parts and positions of the heat-chambers, where the retort is placed; and the use of globes or chambers over the retorts, for the expansion of the gas or other matters liable to fill the pipes suddenly.

Sixthly. Passing the gas through pumicestone or any other porous substance, instead of previously passing it through purifiers, and for the mode in which it is done in this construction of apparatus.

Seventhly. Suspending the retort by the neck, instead of supporting it at the bottom, or by the sides, as usual, by which arrangement a more equable heat is produced in the retort.

Eighthly. Projecting the oil on an incandescent surface, in place of projecting it upon matters within the retort, or on its bottom only.

Ninthly. Forming the sides of the retort, on which the oil is projected, inclined, or serrated, as shown and described.

CHARLES ROPER MEAD, of Charlotte Cottages, Old Kent-road, mechanical engineer, for "*improvements in apparatus for measuring gas, water, and other fluids.*" Patent dated Jan. 21, 1851.

The first improvement in this specification relates to the construction of what are called wet gas-meters, for measuring the passage of gas, and consists in constructing the meter with one measuring vessel only, but which has two chambers, into which the gas is received and discharged alternately. The outer case of the meter is somewhat of the usual form, and in it is suspended, upon an horizontal axis, the measuring vessel; this contains two chambers, one on each side of the axis, the height of the water within the meter being such as partially to submerge the measuring vessel. The under sides of the chambers are open; and there are two pipes, one to the interior of each chamber: these are double elbow-pipes; and their other ends, which are above the surface of the water, are closed by a slide-valve, which also covers the end of the gas-inlet pipe; so that, as the valve is moved over the passages in the pipes, it admits the gas through one or the other of them into its respective compartment or chamber of the measuring vessel, according to its position. This slide-valve is connected to, and worked by, a tumbler-lever, which is put into action by the movement of the measuring vessel itself, the valve being in such a position that the gas, in flowing into the lowest chamber of the vessel, gradually oscillates or vibrates over to its opposite position, and in doing this it comes into contact with the tumbler-lever, and throws it over to its reversed position, when it shifts the valve over the passages, and changes the admission of gas to the other or empty compartment of the vessel, and allows the gas in the full compartment to be discharged, reversing, at the same time, the oscillatory movement of the measuring vessel itself. The tumbler-lever, as it falls over on each side, is received upon a spring, or other mechanical means, the action of which is intended to support the lever, and assist in throwing it over when acted on by the movement of the measuring vessel.

The second improvement consists in a modified arrangement and construction of the first improvement, the only essential difference being, that in this two measuring vessels and sets of pipes and valves are employed, but the mode of action is the same.

The third improvement consists in the manner of constructing and working the indicators. There is a small rod attached to the measuring vessel, which passes up a small tube to the indicating apparatus; the lower end of the rod being below the surface of water in the meter, to prevent the gas passing up it. The upper end of the rod carries a click, which takes into the teeth of a ratchet-wheel attached to the indicators, and, when the meter is in action, the oscillations of the measuring vessel cause the rod to rise and fall, and thus, by means of the click, move the ratchet-wheel round one tooth at each oscillation, and so move round the hands or indicators.

The improved indicators consist of four or more discs or wheels, arranged side by side, upon a single axis, in the same manner as the apparatus usually employed for registering regular progressive numbers, which is well known. The wheels have numerals marked upon them, and, as they move round at different speeds, represent the units, tens, hundreds, and so on, of cubic feet of gas passed through the meter.

The fourth improvement relates to meters for measuring the flow of water and other fluids. This machine is constructed upon the same principle as the gas-meter, with the exception that the measuring vessel is inverted, the chambers alternately receiving the water to be measured from a pipe above the oscillatory movement, allowing the water to flow into the chamber upon the elevated side, and when the chamber is filled it preponderates over the other side, descends, and discharges its water, whilst the other compartment is filling; thus filling, emptying, and acting alternately.

The patentee claims:—

First. The arrangement and construction of meters for measuring gas, and supporting therein a counterbalance tumbler-lever, by means of a spring or other mechanical arrangement, by which the lifting of it to a vertical position by the oscillatory movement of the measuring vessel is assisted, and whereby the resistance offered to the gas by the working of the meter is considerably reduced; also, the employment of one oscillating measuring vessel only.

Secondly. Constructing meters for measuring gas by the employment of two or more oscillatory measuring vessels, and the employment of one or more slide-valves.

Thirdly. The improved construction of indicating apparatus described, consisting of a series of discs or wheels having figures upon their circumferences, and placed side by side, so actuated that the quantity of gas passing through the meter may be indicated.

Fourthly. The construction of meters for measuring water and other fluids, by the employment of a vibrating or oscillating vessel having chambers at each end for receiving the fluid to be measured, and having a partition between, so as to cause the fluid to flow alternately to each side of the vessel, whereby the employment of valves is dispensed with.

HENRY DIRCKS, of Moorgate-street, in the city of London, engineer, for "*improvements in the manufacture of gas, in gasburners, and in apparatus for heating by gas.*" Patent dated February 24, 1851.

The first improvement described in this specification consists in a method of charging the retorts of gas apparatus with the coal from which the gas is generated, and at the same time diminishing the production of gas tar; and in obtaining gas from the gas tar produced in the process of destructive distillation of coal in the manufacture of gas for illuminating and heating purposes. In the ordinary process of manufacturing gas as it is generated in the retorts, it is allowed to pass directly into the hydraulic main, and thence to the condenser; but, instead of thus proceeding, the patentee proposes to intercept the gas before it arrives at the condenser, and cause it to mix and mingle with the vapour from heated gas tar, and when so mixed to pass amongst coke or other matter in a state of incandescence, and thence to the condensers and purifiers as usual. To effect this the gas is first generated in the retorts in the usual manner, and passes thence to the hydraulic main; but, instead of passing direct to the condensers, it is caused to pass into a large boiler provided with an agitator containing coal tar; this is of similar construction, and set over a furnace in like manner, by which the coal tar is heated and the vapour produced; here the gas mixes and combines with the vapour, and in that state they pass together, first into a retort set in a vertical position in a furnace. This retort is filled, or nearly so, with coke, broken tiles, or other materials out, whatever materials may be used, they should be broken into small pieces. The mixture of gas and coal tar vapour from the boiler passes into the lower end of the retort, and thence through it upwards amongst the materials in a state of incandescence. By this means the heat will decompose the vapour, and will combine permanently with the gas. The gas then passes off from the upper end of the retort into the lower end of another retort, similarly placed and charged, and through which the gas passes as before. It is then conveyed away to the condensers and purifiers, to the purifying action of which it is subjected in the usual manner.

The next improvement consists in passing the gas, after it is generated in the retorts, through what the patentee calls a head apparatus, previous to its passing into the hydraulic main. This apparatus consists of an ordinary retort, set horizontally in the furnace in the usual manner. The gas generated passes from the front end of the retort instead of the back end, and thence passes along a horizontal pipe placed parallel with, and immediately above, the retort. This pipe passes through the back of the furnace, and, by means of a vertical pipe connected to it, the gas passes off to the hydraulic main as usual.

The next improvement consists in placing in the retort, either mixed with the coal under operation, or separate and distinct from it, substances or materials of an absorbing nature, for the purpose of absorbing and preventing the production or accumulation of coal tar. These materials may be small pieces of broken coke, tile, brick, or sawdust.

The next improvement consists in the production of gas by dropping coal tar, resin, oil, and other fatty materials, upon coke produced from the description of coal known as Boghead cannel coal, either when used alone or in combination with coal.

Another improvement consists in a manner of charging the coal into the retorts; this is by means of a sort of shoot or box, of a size sufficient to be inserted, with its charge of coal, into the retort, but of sufficient capacity to contain a whole charge of coal. The bottom of this shoot is made movable, and when the shoot, with its charge of coal, is inserted into the retort, the bottom is slid out, by which the coals will be deposited in the retort, and the shoot may be then removed, leaving the coals behind.

The second head of the improvements contains several modes of constructing burners for combustion of gas; the general principle upon which these are constructed is, the adjustment of the aperture in the burner for the discharge of gas, so as to increase or decrease at pleasure the amount of gas, and, consequently, the intensity of illumination.

The third head of the improvements consists of a mode of burning and consuming gas for the purposes of heating; it is applicable to the heating of steam and other boilers, stoves, and other purposes where heat is required. The end of the gas-pipe may be formed with one or more jets, or a greater number of smaller perforations or wire-gauze, for the discharge of the gas. This is inserted with another pipe of larger diameter, into which the gas discharged from the gas-pipe is received; atmospheric air is also admitted to the larger pipe, and there the gas and the atmospheric air become combined. The end of the larger pipe is provided with a number of perforations, through which the combined gas and atmospheric air issue, and, being lighted, it is here the combustion takes place and the heat obtained. The quantity of atmospheric air admitted is regulated by an adjustable regulator.

The patentee claims:—

First. Intercepting, during the process of manufacturing coal gas, the gas in its passage from the hydraulic main of the apparatus to the condenser, and causing it to combine and mix during its passage with the vapour produced from heated coal tar, and, when so combined, to pass amongst suitable materials (in a state of incandescence) placed in proper closed vessels or retorts.

Secondly. The particular method described of passing crude or unpurified coal gas through head pipes or apparatus in its passage from the retort to the hydraulic main of gas-manufacturing apparatus.

Thirdly. The employment, in the same retort in which coal gas is manufactured from coal, of absorbent materials, placed either mixed or combined with the coal, or separate and distinct from it, for the purpose of absorbing and preventing the accumulation of coal tar.

Fourthly. The manufacture of gas by dropping coal tar, resin, oils, or other fatty matters, upon the coke obtained from Boghead cannel coals, either when employed alone or in combination with coal.

Fifthly. The mode described of charging the coal into the retorts of gas-manufacturing apparatus.

Sixthly. The several constructions of gasburners described for the combustion of gas.

Seventhly. The method described of effecting the combustion of coal gas for the purpose of heating.

(Upon inspection of the deposit paper lodged when this patent was applied for, we find nothing there stated which can support the fourth and fifth claims, the processes described in which are consequently thrown open to the public.)

Legal Intelligence.

MIDDLESEX SESSIONS,
July 7, 1851.
(Before Mr. Sergeant Adams, Assistant Judge.)

Samuel Andrews, Esq., secretary to the Equitable Gaslight Company, on appeal against a conviction of Peregrine Bingham, Esq., police magistrate, who, on the 15th of May, 1851, convicted the Equitable Gaslight Company under the eleventh section of the 57th George III., cap. 29, in a penalty of £3. 1s. and 2s. costs, for breaking and taking up 1200 square feet of carriageway paving of certain public streets, called Great Windmill-street and Coventry-street, in the parish of St. James, Westminster, without the consent of the commissioners duly appointed for paving and improving the said parish of St. James.

Mr. Bodkin appeared as counsel for the appellant, and Mr. Clarkson and Mr. Huddlestone appeared to support the conviction.

Mr. Clarkson: Sir, I appear in this case in support of the conviction against which this appeal is made, and there are questions involved under several acts of Parliament. The 57th of George III. (Michael Angelo Taylor's Act)——

Mr. Sergeant Adams: Is this case to be decided by me, or is it to be taken ultimately to the court above for decision?

Mr. Clarkson: The power is certainly taken away by which the case could be taken from this court to the Court of Queen's Bench, but under Baines's Act there is not, I apprehend, any difficulty with regard to that. The question in the case, undoubtedly, is one of very considerable importance; and it certainly would be a great benefit if the opinion of the Court of Queen's Bench could be obtained upon it, as the facts are not disputed, as in that case the opinion of that tribunal would be of great advantage for the future guidance not only of the present parties, but of others in similar matters. The Metropolitan Paving Act gave the commissioners the power of consenting to the laying down of mains, and such consent was not necessary in regard to service-pipes; and in the present case the question will be, in fact is, whether a particular pipe laid down by the Equitable Company is, or is not, a service-pipe; and whether, in respect of that pipe, it was necessary for the Equitable Company to give the commissioners the notice required in the case of mains; and whether the consent of the commissioners required in the case of mains ought not to have been applied for in the particular instance under consideration.

Mr. Sergeant Adams: If that is so, it is a very important question, as it appears to me to affect the whole metropolis.

Mr. Clarkson: No doubt; and the magistrates below, two of whom have had this question before them, think differently upon the subject, Mr. Bingham having held a particular view, whilst Mr. Hardwick entertained a different opinion upon the matter.

Mr. Bodkin: After the decision of Mr. Hardwick nine years ago, the practice of the Equitable Company has been uniform; and, now another decision has been pronounced, the commissioners are acting upon it, and here we are suddenly involved in these proceedings.

Mr. Sergeant Adams: Then, I suppose, you wish to go on.

Mr. Bodkin: Yes; we shall be very well satisfied with the decision you may pronounce upon it.

Mr. Sergeant Adams: What are the facts?

Mr. Bodkin: They are before you, and they are not disputed. No question arises on them, and what you have to decide is, what is the meaning of a particular passage in the act of Parliament?

Mr. Sergeant Adams: Very well, then. Go on, Mr. Clarkson.

Mr. Clarkson said, before the court had got half through the case, it would come to the conclusion that it was just the case he had stated to the court, and that it would be much more desirable for the parties to have consented to the course he had suggested, of agreeing upon a statement of the facts, and to go to the Court of Queen's Bench and ask its opinion upon the question of law that arose upon them, and which was the subject of contention on the present occasion. As he had stated, there were several acts of Parliament involved in the case. By the 5th Victoria, cap. 36, secs. 154 and 205, the Equitable Gas Company were authorized, subject to the General Paving Act of the 57th George III., cap. 29, to lay down under certain roads and streets, under the authority of the commissioners, certain pipes; and that General Paving Act, in the eleventh section, enacted that no gas or other company should break up or disturb any pavement or road for the purpose of laying down mains, pipes, &c., without a formal notice to that effect given to the commissioners, whose consent in writing for such mains and pipes to be laid down was to be obtained before such company could proceed to lay them down. [The learned counsel read the section he had referred to *.]

It would not be denied that, upon the two days mentioned in the conviction, the Equitable Gas Company, without the consent of the commissioners, did, contrary to the provisions of the act, break up a portion of the parish of St. James, Westminster, for the purpose of laying down what they called a service-pipe from a main pipe in Coventry-street, and carrying it for some 1000 or 2000 feet along Great Windmill-street; and yet, though the pipe was carried this distance from Coventry-street, and was considerably a larger pipe than "service" pipes usually were, the company persisted in calling it a service-pipe, and they would now contend by his learned friend that they were authorized to lay down such a pipe without the consent of the commissioners.

Mr. Sergeant Adams: What was the size of the pipe?

Mr. Clarkson said it was a pipe of two inches bore, and one inch was the bore of a service-pipe before allowed under the Gaslight and Coke Company's Act.

Mr. Bodkin: This pipe was 140 yards long, and it was carried along Great Windmill-street for the purpose of supplying *one* establishment.

Mr. Clarkson continued. Except it was under some provision in Michael Angelo Taylor's Act, the company clearly had no authority to do what they had done. The contention here would be, that under this (Michael Angelo Taylor's) act, and one or two others, the company had authority to break up any pavements for the purpose of laying down service-pipes, but not "mains," *without the sanction of the commissioners;* and the words under which it would be contended that authority was constituted were these, a "new set of mains," the view of the company being that they, having laid down their mains with the consent of the commissioners, needed no consent of the commissioners for the purpose of laying down from such mains "service" pipes, or such a pipe as they had done in the instance at the present moment under consideration.

Mr. Sergeant Adams: The company having laid down their mains properly with the consent of the commissioners as required, it implies that they have a right to lay down pipes from those mains to supply the houses in the particular line of those mains.

Mr. Bodkin: The company have a main in Coventry-street, and the pipe in question was carried from that main.

Mr. Huddlestone: But the company have no main in Windmill-street, so this must be at least a main as far as that street is concerned.

Mr. Sergeant Adams: But it was to supply only one establishment. Can you call that a main? A main is not laid on for one house, and carried up to it.

Mr. Clarkson said in the court below that the word pipe, as distinguished from that of main, had a narrow and not an extended sense.

Mr. Sergeant Adams: Let me have the facts.

Mr. Bodkin: They are before you.

Mr. Sergeant Adams: Well; then it appears that the *main* pipe goes along Coventry-street; that was placed there by the consent of the commissioners. There is another main-pipe in Windmill-street; but not one of the Equitable Company's. They put down a pipe of

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* "And be it further enacted, that it shall not be lawful to or for any *water* or *gaslight company*, or for any commissioners of sewers, or any person or persons acting by or under the authority of them, or any of them, or on their account, *to break* or take up, or cause to be broken or taken up, *any of the pavements in any of the streets* or public places within the jurisdiction of this act, *for* the purpose of making and *laying down any main or mains of pipes*, or of making any sewer, vault, or drain, or for any other purpose (except for the purpose of altering the position of, or of repairing, any pipes, stopcocks, or plugs, or of substituting iron for wooden mains or pipes, or of repairing, cleansing, or altering any sewer, vault, or drain), *unless notice in writing of their intention to break* or take up *such pavement*, signed by the principal clerk or secretary of such water or gaslight company, or commissioners of sewers for the time, or by their surveyor, or inspector, or turncock for the time being, specifying the street or public place, and the particular part of such street or public place, in which such pavement is intended to be broken or taken up, *shall have been given to a surveyor of the pavements* for the time being of the parochial or other district wherein such street or public place the pavement whereof is so intended to be broken or taken up *shall be situate*, or shall have been left for him at his dwelling-house or office within such parochial or other district, *for the space of* three days at the least before such pavement, or any part thereof, shall be so broken or taken up for the purposes aforesaid; and that no *gaslight company shall break* or take up, or cause to be broken, or taken up, or disturbed, *the pavement of any street* or public place for the purpose of *laying* ANY NEW MAINS OR PIPES *without the consent in writing of the commissioners or trustees* having the control of the pavements in any parochial or other district *signified* under the hand or hands of their clerk or clerks, or other proper officer or officers, *first obtained;* and also that any water or gaslight company, or commissioners of sewers, or any of them, who shall break or take up, or cause to be broken or taken up, any of the pavements in any of the streets or public places within the jurisdiction of this act for the purpose of altering the position of or repairing any pipes, stopcocks, or plugs, or of substituting iron for *wooden mains or pipes*, or of repairing, cleansing, or altering any sewer, vault, or drain, shall give such notice thereof as aforesaid, signed as aforesaid and in manner aforesaid, unto such surveyor as aforesaid, within twelve hours after any such water or gaslight company, or commissioners of sewers, or any person or persons acting by or under the authority of them, or any of them, or on their account, shall begin to break or take up, or to cause to be broken or taken up, any of such pavements for the purposes last aforesaid; and *that if* any such *water or gaslight company*, or any commissioners of sewers, or any person or persons acting by or under their authority, or on their account, *shall break* or take up, or cause to be broken or taken up, *any of such pavement* (except for the purpose of altering the position of, or repairing, any pipes, stopcocks, or plugs, or of substituting iron for wooden mains or pipes, or of repairing, cleansing, or altering any sewer, vault, or drain), *without such three days' previous notice being given* or left as aforesaid, or if any *gaslight compang shall break*, or take up, or disturb, or cause to be broken, or taken up, or disturbed, any of *such pavement* for the purpose of *laying down any new mains or pipes without such consent as aforesaid*, or if any water or gaslight company or commissioners of sewers who may break or take up, or cause to be broken or taken up, any of the pavements aforesaid for the purpose of altering the position of, or for repairing any pipes, stopcocks, or plugs, or of substituting iron for wooden mains or pipes. or of repairing, cleansing, or altering any sewer, vault, or drain, shall refuse or neglect to give or leave, or to cause to be given or left, such notice thereof as aforesaid within twelve hours after any such water or gaslight company, or commissioners of sewers, or any person or persons acting by or under the authority of them, or any of them, or on their account, shall begin to break or take up, or to cause to be broken or taken up, any of such pavements, *then and in every such case the company*, or commissioners of sewers, or other person or persons so breaking or taking up the same pavement, or any part thereof, or causing or directing the same to be broken or taken up, or under whose authority or on whose account the same shall be broken or taken up, or the persons so breaking or taking up the same, *shall forfeit and pay* to the commissioners or trustees, or other persons having the control of the pavements within the parochial or other district in which such pavement so broken, or taken up, or disturbed shall be situate, or to their treasurer, clerk, or surveyor, or to such other person as they may appoint, *the sum of* 40*s. for every square foot of pavement* which shall be so broken or taken up *without such notice or consent as aforesaid*, to be recovered in the same manner in which other forfeitures and penalties are hereinafter directed to be recovered by virtue of this act."

two-inch bore from the main in Coventry-street along Windmill-street to supply one establishment. What establishment is it—an hotel?

Mr. CLARKSON: The Hunterian Museum.

Mr. Sergeant ADAMS: Very well; go on.

Mr. CLARKSON proceeded. The twelfth section of the act of Parliament called Michael Angelo Taylor's Act, which regulated the construction of pipes, gives directions about "new mains or pipes," and then came an alteration of the words, which it was suggested was a mistake or a blunder of the statute, for in another section of the act the words "mains of pipes" were used instead of "mains or pipes;" and the court would have to determine whether in the one case the word "of" had been substituted for "or," or in the other whether the word "or" had not been used in the statute by mistake for "of." Now, the whole case would depend upon this, the argument on the other side being that "or" had been used instead of "of;" but this was a matter that might easily have been set to rights by an inspection of the rolls of Parliament. Another argument that was to be urged on the other side was, that it would be a matter of great public inconvenience that for the purpose of laying such pipes as the one in question the company should have to wait three days for the consent of the commissioners; but that, he apprehended, would be less a matter of inconvenience to the public than that the pavements and roadways over which the public had a free right of transit should be taken up, broken, and rendered impracticable, without the sanction of the commissioners into whose care such roadways and pavements had been confided by the Legislature. That argument, therefore, the court would see, cut both ways, as was remarked by the magistrate below. It was as inconvenient to have the public thoroughfares impeded by the pavements and roadways cut up, as for the public to wait a few days for gaslights. That argument would not, therefore, avail much; there was no doubt the acts of Parliament were difficult to construe, but was it to be expected that gas companies were to have unlimited authority to break up the pavements in the public streets? Was it but reasonable that the commissioners who had the control of the pavements should have authority to prevent those pavements being interfered with but by their consent? Was it reasonable that any gas company should be allowed to tear up, as this company had done in this particular instance, 1000 feet of pavement in absolute defiance of the commissioners whom the Legislature had said should have the care, control, and management of those pavements? Michael Angelo Taylor's Act was passed expressly to prevent this; yet it was said that that very act enabled the company to do as they had done against the authority of the commissioners. The magistrate below, for whom he entertained unfeigned respect, when this case was before him, expressed an earnest desire that the question, which he considered to be one of importance and great nicety, might be taken for decision to the highest source, in order that the parties might have for their guidance the opinion of the highest tribunal of the country; and it was in consequence of that that he had made the suggestion he had, that the case should be carried into that court for the purpose of being decided finally and definitively. The 56th of George III., sec. 8, gave certain directions and granted certain powers to the Gaslight and Coke Company; but it was by the eleventh section of the act of the 57th year that the court would be guided. He was stating to the court that the 56th of George III. gave certain directions in the eighth section to the Gaslight and Coke Company; and the court would, he thought, come to the conclusion that the meaning of the words in that section was identical with that of the eleventh section of the 57th, although in the latter the words were varied by the accidental insertion of the word "of" for "or." He would show the court that the meaning of the two sections he had mentioned of the acts before the court was identically the same, although the words "mains of pipes" were in one place used for "mains or pipes." It was obvious that it was intended to convey the same meaning in both, and it was obviously the intention to give the commissioners the same power over the pipes to be introduced into the streets as over the mains. That was clearly the intention of the one section, and it followed, of necessity, that the intention of the Legislature was precisely the same in the other; and the court would therefore, he thought, be guided more as to what was the intention, rather than upon the mere construction of a word. Section 8 read as follows:—"And that the said company shall not break, or take up, or disturb, or cause to be broken, or taken up, or disturbed, the pavement or ground in any street, road, or public place within the limits aforesaid, for the purpose of laying down any mains or pipes, except service-pipes of a diameter not exceeding one inch in the bore, without the consent in writing of the commissioners, or trustees, or other persons having the control of the pavements, or roads, ground, or soil in any parochial or other district or place, signified under the hand or hands of their clerk or clerks, or other proper officer or officers, first obtained." The pipe in question was two inches in diameter in the bore, whilst in the act of Parliament the diameter of a service-pipe in the bore was given at one inch; and in the act a special exception was made in regard to service-pipes, as distinguished from pipes in the sense in which that word was used by the act in the passage referring to mains of pipes. (Section read.) And the very company to which this act referred, the Chartered Gaslight and Coke Company, conscious of there being no distinction made between mains and pipes, except service-pipes of one inch in the bore, in the section of the act of Parliament, ten years later got an act of Parliament passed (4th George IV., cap. 29, sec. 15) to enable them to lay down a two-inch pipe, they not having the power to do so under the general authority given to them by their original act. The Equitable Company were just in that position; they had not the power to lay down this pipe as a service-pipe without the sanction and consent of the commissioners, although there was an exception in the act in favour of pipes which were proper service-pipes. In conclusion he had to say that, if that court, constituted as it was, was of opinion that in this case the company had done more than they were authorized in laying down the pipe, he was still ready and willing, on the part of the commissioners, to go upon the facts into the Court of Queen's Bench, to take the opinion of that tribunal upon the, no doubt, difficult and important question that had to be decided in this case.

Mr. HUDDLESTONE said he appeared with his friend Mr. Clarkson on the part of the commissioners to support the conviction, and he heartily and cordially agreed in the wish expressed by his learned friend at the conclusion of his address, and which wish he saw was concurred in and approved of by the representatives of the company who sat below his friend Mr. Bodkin. He apprehended the court would have no difficulty at all in dealing with this case, and he would call the attention of the court in the first instance to the eleventh section, which his learned friend had argued upon. That section provided that no road, pavement, &c., should be broken up by any company for the purpose of laying down mains or pipes except on certain conditions; and he would ask why the words "or pipes" was used if the Legislature had not intended the act to comprehend something beyond "mains"? A main, it was clear, the act intended should be understood to be the principal pipe of supply for a whole district; and "pipes," it was clear, too, the framers of the act meant, by using that word in addition to mains, contemplated placing in the hands and within the control of the commissioners something beyond what was understood to be comprised in the term "mains." In looking at an act of Parliament reference must be had to the object the persons who framed it had in view; and it was, he apprehended, quite clear from this act of Parliament that the intention of its framers was that three days' notice should be given to the persons who had the care and management of the pavements before any company should tear up any pavement for the purpose of laying down any mains *or* pipes; and the object of this was reasonable, inasmuch as it was only proper that the paving commissioners should have the power of, and the means of, seeing that what the company did was done properly. The only exception in which the pavements, &c., could be broken up without the three days' notice was when it was necessary to disturb the pavements for the purpose of repairing mains or pipes already laid down, of stopping leakage, repairing plugs or cocks, for substituting iron piping for wooden pipes and mains, and for cleansing, or under any special emergency or necessity of the case, and all those things could be proceeded with provided notice were given within twelve hours of the commencement to the surveyor, so that that section of the act, as it appeared to him, referred to two classes of cases—an old thing and a new thing; for wooden pipes, such as were formerly used, could be taken up and replaced with iron. The act provided that in the months of January, February, and December, the pavements and roadways should not be broken up for the purposes of mains or pipes being laid down, and that mains and pipes must be of iron; so that it was clear that the mains were distinguished in the act from pipes. Though the company relied that the words "mains of pipes" in the act were there used properly, it was apparent from other sections of the act that when those words were used the meaning the Legislature intended them to convey was "mains or pipes," those being the words repeatedly used elsewhere.

Mr. Sergeant ADAMS: What is a main?

Mr. HUDDLESTONE: A main is the principal pipe of supply, from which other smaller pipes derive a supply.

Mr. Sergeant ADAMS: If I went to an ironmonger's and asked for a main I think he would stare at me; but if I went and asked for a main-pipe he would at once know what I meant.

Mr. HUDDLESTONE: If you think the pipe laid down by the Equitable Company from Coventry-street to Great Windmill-street is a main I am relieved from all difficulty in the case, because it is quite clear and undisputed that for a main three days' notice must be given to the commissioners.

Mr. Sergeant ADAMS: What is a main?

Mr. HUDDLESTONE: The main-pipe is the principal pipe of supply for a district.

Mr. Sergeant ADAMS: What is a main according to this act of Parliament?

Mr. HUDDLESTONE: The principal pipes which supply the smaller pipes no doubt are mains.

Mr. Sergeant ADAMS: I see you will not answer my question. Is a pipe, a small pipe, carried from a large pipe along a street to supply one house, an hotel, a main-pipe? Do you carry a main-pipe right up to a house to supply that house with gaslights?

Mr. HUDDLESTONE: A main I take to be a principal pipe, and pipes must be something different from mains.

Mr. Sergeant ADAMS: "Mains of pipes" appears to me to be far more intelligible than "mains or pipes." "Mains of pipes" of course implies more than one pipe.

Mr. HUDDLESTONE: I see there are no such words as mains of pipes in the eleventh section.

Mr. Sergeant ADAMS: I say they are in the eleventh section of the act I have before me.

Mr. BODKIN: Both "mains of pipes" and "mains or pipes" are used.

Mr. Sergeant ADAMS: The question is, whether the word "of" or the word "or" has crept into the act of Parliament by mistake, one word for the other. It is very probable that "or" was copied by the clerk instead of "of."

Mr. HUDDLESTONE did not think that that would do, as the words "mains or pipes" were in the twelfth section, and therefore it would seem that they were properly used in the particular section in question; and further on there was a subdivision of the word pipes by the introduction of the word service-pipe, this showing that service-pipe was a pipe intended to be different from pipes in the sense in which that word was used in the passage relating to mains or pipes.

Mr. Sergeant ADAMS: I think it would be as well if Mr. Michael Angelo Taylor were here to interpret his own nonsense, as I never knew an act that gave rise to so much difficulty, perplexity, and inconvenience.

Mr. BODKIN: And expense.

Mr. Sergeant ADAMS: Yes, and expense.

Mr. HUDDLESTONE: What is the plain common meaning of this act of Parliament? If it was not an exigency or absolute necessity for the company, it appeared to him that under the act they were bound to give three days' notice to the commissioners. The act said the pavements were not to be disturbed or broken at all during the months of January, February, and December; and what was that but to give the commissioners authority and control over such pavements for the protection of the public? and surely there had been in this case such a breaking of the pavement as required the sanction of the commissioners. It was not a service-pipe, because service-pipes were distinguished from "mains or pipes" in the act of Parliament. If it was absolutely an emergency, and it was absolutely necessary, then it could be done, and the notice given within twelve hours; but, if it were an ordinary case of a man requiring a pipe to be carried along a street to supply his house with gas, it appeared to him that it was necessary that notice should be given to the commissioners; and, if it was then requisite or worth while to refer to acts of Parliament to see what their words were, the Gaslight and Coke Company's Act showed that such pipes should not be laid down without three days' notice. He submitted, therefore, that the conviction must be confirmed.

Mr. BODKIN, for the appellant, said he thought it right to inform the court, and to explain, what had been done, and why it had been objected on the part of the Equitable Gas Company, which was represented by the appellant, that this matter should be taken up to the Court of Queen's Bench; and he was desirous of showing what the position of the matters involved was. The question now to be decided had for many years been construed in the way he had to present it to the court on behalf of the company; it had several times been decided in favour of the view taken by the company by Mr. Hardwick, once upon a mandamus; but, now a different decision was come to, it was offered by the commissioners to take the case into the Court of Queen's Bench. It had happened that his friend Mr. Clarkson had on more occasions than one appeared for the company, and had, with his usual ability, convinced the court below that there was no necessity to give the commissioners notice under the circumstances of such a case as the present; and it had so happened that on this particular occasion, when he appeared for the commissioners, he had read an opinion of Lord Campbell, given when he was Attorney-General, which opinion, however, was in favour of the proposition he was about to submit to the court on behalf of the company; and, therefore, it appeared to them quite useless to take the question before the Court of Queen's Bench, because that would only be going to obtain another expression of the opinion of the same authority,—an expression of opinion, he had no hesitation in saying, which would be precisely the same as that given on a former occasion, and to which he had referred as having been used by his friend before the magistrate, to show the importance of the case being definitely decided. The question had been suffered to sleep for nine years, and the company had laid down all their service-pipes without obtaining the consent of the commissioners; but here they were suddenly brought into proceedings again, but with what result the proceedings of the commissioners would meet he had little hesitation in forming an opinion. He would not say that any new speculation was the cause of the commissioners coming thus suddenly down upon the Equitable Company, or that any rival company had excited in the commissioners that which induced them to come forward in this manner to assert their rights and privileges, and summon them before Mr. Bingham; and the company did not agree to the course proposed, as they believed that they would hear no more of the matter after that day, and he believed that they would be relieved from all further impediment and obstacle in this respect after that court had given its decision upon the matter. His friend Mr. Huddlestone had, it appeared to him, misconstrued the question between them: all he had urged and argued he conceded. His argument was that, if this was not an exigency as comprised in the meaning of the eleventh section of the act, three days' notice must be given by the company to the commissioners, and that the giving of such notice, supposing it were not an exigency, would be requisite to make their proceedings valid. The company would be perfectly contented with the decision of that court upon that, for the three days' notice was given in this case. The mains of this particular company were in the jurisdiction of these commissioners, and they had been laid there by and with their consent and sanction; and the question was, was it requisite to do anything further than give them notice when it was required to carry a service-pipe from a main to supply a particular establishment with gas, the main being down with the consent and sanction of the commissioners. That was precisely how the company stood, and therefore Mr. Huddlestone had not addressed himself to the point upon which the company relied.

Mr. Sergeant ADAMS: When the commissioners gave their consent to the company laying down their mains of pipes, they gave a general consent and authority to the company to carry from those mains of pipes service-pipes for particular purposes. That is what you contend, Mr. Bodkin? There is another question, whether this particular pipe is a service-pipe in the ordinary meaning of that term.

Mr. BODKIN: The company wished the decision of the court to be upon the general question,—whether a consent was required previous to laying down a service-pipe. [The learned counsel then read the first part of the eleventh section of the act to show that the three days' notice related to both water and gaslight companies, and that the consent related to gas companies.] He then called particular attention to the words of the section, viz., "that no gaslight company shall break, or take up, or disturb, or cause to be broken, or taken up, or disturbed, the pavement of any street or public place, for the purpose of laying down any *new mains or pipes*, without the consent in writing of the commissioners, or trustees, or other persons having the control of the pavements in any parochial or other district, signified under th ehand or hands of their clerk or clerks, or other proper officer or officers, first obtained." And what the court in deciding this question would have to determine was the interpretation to be given to this word "or," as it was used in "mains or pipes." It was clear, he contended, that from the preceding words in the section it would be right if the word "of" were used in that particular part of the section as it was in the others. One set of words following another in a section of an act of Parliament always took the meaning of the like words, if they occurred in a preceding part of the same section or act, especially if there was an error, and the meaning rendered thereby at all ambiguous. The words "mains or pipes" occurred in a section, whilst in another portion of the same act of Parliament, as well as in another, the words mains of pipes were used, and that in such words the meaning and intention of the Legislature were expressed could not be doubted, as they were dealing upon precisely the same point and precisely the same subject. It was clear that, although the words were differently used, both meant precisely the same thing, that "mains or pipes" in one section clearly meant exactly the same as "mains of pipes," the words used in another. Mr. Huddlestone had contended that the twelfth section had reference to service-pipes as well as to main-pipes, and, when asked what meaning was to be put on the words of the eleventh section, he interpreted it in this way, that, though in the one case mains or pipes were being dealt with, the meaning was precisely the same. Pursuing the twelfth clause further, it was found that it was provided that no mains or pipes should be put down by any gas or water company in certain months, and it was easily to be understood why this was so. But if service-pipes from mains already down and in operation were included in "mains or pipes," as it was here used, no person who built a house or a shop could procure a supply of either gas or water during those months, and, therefore, it was quite clear that service-pipes could not be included therein. It no doubt applied to mains of pipes—the larger channels of supply—to lay down which in those months would, no doubt, be attended with inconvenience, as whole streets and thoroughfares would have to be taken up; but it was impossible that it could refer to service-pipes as well as to mains of pipes. He apprehended that even upon principle the case was clear in favour of the company. It seemed to be urged that the Legislature had conferred upon these commissioners powers of a most tyrannical character, but such, he contended, was not the case. He did not think the Legislature in passing this act ever intended to grant to these commissioners the power they contended for of having it in their discretion of saying that any particular house or establishment should or should not have a supply of gas or water, as the case might be. The occupiers of houses were the owners of the carriageway running between their houses, subject of course to the right of the public to a free transit over such road, and to pass thereover, and at common law such inhabitants unquestionably had the right to break open those roads, or the pavement, to have a supply either of water or gas, unless the contrary were ordered in the direct and positive terms of an act of Parliament. He was anxious to know what case the present was, if it was not an exception to the terms of the section. Was the three days' notice required in such a case as this? What were the cases in which the notice was required? If it was required in this case, in what case would it not be required? If it was required in the case of service-pipes, where could the exception be? It was required in the case of the laying down of "mains of pipes," but not for the laying down of a service-pipe from a main-pipe already down by the consent of the commissioners.

Mr. HUDDLESTONE said the three days' notice was required in the case, and so was the consent.

Mr. BODKIN would be glad to learn, then, what were the cases in which the notice was not required. It could not be maintained that either the notice or the consent was required in such a case as the present, and could the court say that this was not the really reasonable and common-sense view of the case? Could it be said that any paving board of commissioners were intended by the Legislature to have the arbitrary power of keeping the inhabitants of any portion of a district over which they had jurisdiction—would it be tolerated that, according to rise or fall of the price of the shares of a particular company, some particular paving board might sanction or refuse the supply of gas and water to any particular house or houses, in order to get the shares of some company taken, say to Nos. 41, 42, or 43, and then refuse or consent, as the case might be? The act of the 56th George III. had been quoted. That was the act of the Chartered Gas Company, and had no bearing whatever on the present case. There was an express exception of service-pipes, and the company had no intention to depart from the law.

Mr. Sergeant ADAMS said the case was one of very considerable public importance, and he should have been very glad if it had been taken to the higher tribunal for decision; but, as it had been preferred that the case should be decided in that court, he had to decide it in the best way he could. Looking at the general principle in determining the meaning of this act of Parliament, he should say that its meaning was, and that it was passed with the intention, of preventing any company or persons coming with mains of pipes into a new district without the consent of the commissioners of paving for that district; and no doubt it would be proper that such should be the case; and it should also be remembered that the act was passed at a time when the antipathy to gas companies was considerable. It appeared to him that the commissioners contended for a power which, in effect, would be for them to say absolutely what house or houses should be supplied, or should not be supplied, with gas or water. The power contended for was this, that, having given the company the power in the first instance to lay down their mains along the streets, they still had the right to determine what service-pipes should or should not be laid on to those mains, which houses should be supplied, and which should not. If there were a main-pipe along a street that had not half a dozen houses in it, would it not be monstrous to say that these commissioners had the power of saying which of the houses, when the street was built, should have water and which

should not? And this was what was contended for under this most marvellous act of Parliament. What was the eleventh section? (Section read.) Now, which was right,—"mains of pipes," or "mains or pipes"? What was the meaning of the word main? He could understand what a main road was, the main body of an army, a main river; and there could not, he thought, be any doubt that in this act of Parliament mains of pipes was what was intended, and mains of pipes were the pipes that were carried along the streets to supply the houses. "Main of pipes" were terms referring to the system, and not to particular pipes. It would be absolute nonsense to say that a main was not a pipe, and, whilst "mains" referred to the larger pipes, "of pipes" referred to the minor ones. Well, the act changed the words. It said mains or pipes. After that there was a great variety of ringing the changes, and in the twelfth section the words were "complete mains or pipes." What did complete mean? Did it not infer that the minor pipes were to be considered as portions of the whole, and did not that justify "mains of pipes"? The commencement of the twelfth section was the reverse of the eleventh, and the changes were rung again, and afterwards the words used were "mains of pipes." And this was the act of Parliament of which the court had to make sense. It was clear that there was a mistake in the act in the use of the word "or," or in the use of the word "of." That was quite evident. Might not the copying clerk have easily used one word for the other, and had written "or" instead of "of"? Acts of Parliament had sometimes to be brought in to say what was the meaning of other acts; but where there was a difficulty of this kind it would be going too far for any one as a judge to declare which was or should be right. He thought the view taken by Mr. Bodkin was quite reasonable. When they used the words mains or pipes, they meant to define something different from mains. What was a main if a pipe was not? The word main was a substantive and not an adjective. The meaning of it all was this—the act meant that no company should lay down new mains of pipes without the notice to the commissioners. The word "or" being used instead of "of," it was contended by them that the "or" related to service-pipes. If that were so, no one could be supplied in a new house with gas or water for at least three months in the year. Taking this view of the case, and assuming that the pipe in question being carried from a main or principal pipe to supply a house to be what might be termed a service-pipe, and as it was wished that judgment should be given on the general question, the court felt no difficulty in the case. The court, therefore, had not to deal with the individual case. He had no hesitation in saying that, in his opinion, the act of Parliament did not give the commissioners the powers they contended for, and it was unreasonable that they should possess such powers; at the same time it would be unreasonable that the gas company should go about laying down new mains, protesting that they were but service-pipes; and, if the company wished to know if they were to go to the commissioners every time, he did not think they were. The conviction would be quashed.

Conviction quashed.

Miscellaneous News.

MARYLEBONE GAS CONSUMERS' COMPANY.

A public meeting of the gas consumers and ratepayers of Marylebone rectory district was held at the Lord Tyrawley Tavern, on the evening of the 27th ult., to receive some explanations from Mr. John Marriner, secretary of the Marylebone Gas Consumers' Company, respecting the "present position and future intentions of the company."

It was moved that Mr. Lee be requested to take the chair. The motion having been seconded, Mr. Richardson proposed, and Mr. Pearse seconded, Mr. Daniel Kitchin as chairman.

Mr. MARRINER said he observed an individual in the room who had no right to be present, inasmuch as he was neither a gas consumer nor a ratepayer. As long as that gentleman, who had grossly maligned the company, remained in the room, he (Mr. Marriner) must object to making any statement whatever.

Mr. POTTER was of opinion that the gentleman ought not to be objected to on the ground of his not being a gas consumer or a ratepayer. The meeting should be open to all.

The motion respecting the election of a chairman was then put by Mr. Smith, one of the requisitionists, and Mr. Lee was appointed to that office.

The CHAIRMAN, having briefly explained the object of the meeting, expressed a hope that every gentleman who spoke would confine himself to facts. Previous to his being elected to fill the chair, there had been some opposition on the part of Mr. Pearse. Now, he (Mr. Lee) did not care anything for Mr. Pearse. The company was desirous that everything should be established on a good and proper foundation, knowing that anything like a hole-and-corner job would not last. This was a meeting of the ratepayers of the parish, and he (Mr. Lee) wished to know from Mr. Pearse if he were a ratepayer of the parish?

Mr. PEARSE: Yes, sir.

The CHAIRMAN: Of this district?

No answer.

Mr. POTTER said he did not belong to this district of the parish, but he attended for the purpose of getting information. If persons were to be objected to on account of their not being inhabitants of this district of the parish, he would at once put on his hat and walk.

Mr. HUNT said all the opposition offered to the new company had been by Mr. Pearse, who was a shareholder in a company which was in favour of monopoly, and the sooner monopoly was annihilated the better. Mr. Pearse had an interest in the company which the new company was about to oppose, and, not being a ratepayer in the district, he had no right to take any part in the proceedings of the meeting.

Mr. PEARSE: I did not come here to give any opposition, or to speak. I merely want to get at the truth.

Mr. POTTER: Will any gentleman here be allowed to speak, whether he be a ratepayer or not?

The CHAIRMAN: This being a public meeting, I should be glad to see the whole parish here.

Mr. MARRINER: I have no objection to hear Mr. Pearse, provided he adheres to facts.

Mr. PEARSE: Nor have I any objection to hear you on the same condition. I have attended many public meetings, and I never knew of a person being excluded for not belonging to the parish.

The CHAIRMAN: Gentlemen, with your permission, Mr. Marriner will now address the meeting on the subject for which we have assembled.

Mr. MARRINER then said: Gentlemen, I attend here this evening in compliance with the requisition which you have just heard read, to explain to the gas consumers and ratepayers of St. Marylebone the present position and intentions of the Marylebone Gas Consumers' Company. In the first place I would call your attention to the first prospectus of the company. In that prospectus it was stated that:—

"It has been resolved to establish a gas consumers' company for the parish of St. Marylebone, founded on the mutual principle, thereby constituting an identity of interest between the producers and their customers, in which the profits shall be returned to those who create them as consumers, in reduction of price, after payment of a limited dividend.

"This company, then, is established for the purpose of supplying gas to the inhabitants and houses situated within the parish of St. Marylebone, and will engage—

"First,—To supply gas of a maximum purity, and a high standard of illuminating power.

"Second,—To lay on services and supply meters gratis.

"Third,—To appoint independent inspectors to arbitrate between themselves and the public as to the quality, quantity, brilliancy, and price of the gas, and to secure the just measure of their meters, by certifying them with the stamp of the inspectors of weights and measures, or other competent authorities.

"Fourth,—To furnish gas answering all these conditions at a maximum price of four shillings per 1000 cubic feet.

"Fifth,—To restrict profits to a maximum dividend of 10 per cent.

"Sixth,—To appoint independent auditors, with full powers half-yearly to inspect the books of the company, and, upon their report that the profits exceed 10 per cent., to apply the surplus to a reduction in price to the public."

The directors were induced to form the company at the suggestion of some of the largest gas consumers in the parish. Seeing the immense success which attended the operations of the Great Central Gas Company in London, they were anxious to establish a similar company in this parish. They responded, therefore, to the call of the ratepayers and consumers, and issued this prospectus. The directors of the Marylebone Gas Company are further strengthened by the support derived from the gas consumers themselves. It may be asked what is that support? It amounts this evening to 2848 written contracts to take the gas of the company for three years, which, with verbal promises to the like effect, and on which we can place the fullest reliance, will realize to this company an income of £20,000 per annum, and that without having canvassed a single public building or institution, or taking into consideration the public lights; but we had promises on which we could rely which would raise the annual income to nearly £30,000 per annum. Our capital was originally fixed at £150,000, but we reduced it to £120,000, in consequence of the directors having resolved to send a practical man to the north of England, where some of the largest and best-managed gas works exist, Manchester and Salford for instance, whose whole municipal expenses are I believe, defrayed out of the profits derived from gas. In examining the various modes of making gas by the parties engaged to ascertain the cheapest modes, we found that the estimate originally tendered was very much over the mark; and that a saving of £30,000 could be effected. That being the case, would the directors be doing justice to the parish of St. Marylebone merely because they have been personally and most malignantly maligned in withdrawing from an undertaking which contained every element of success? (Cheers.) I say they would not; and, what is more, they will not. I think that, with the feeling abroad in favour of free-trade principles (and there are no people more alive to them than those of Marylebone), the directors will not shrink from their duty in promoting free trade in gas. Will it be endured that, while you have free trade in corn, and in almost every article you consume, you are to have monopoly in gas? The result of the canvass convinces us that you will not suffer monopoly in the article of gas. It may be said, "You have taken a loose canvass." I beg to state that every single contract has been tested with the greatest care. A letter has been sent out, immediately on the receipt of the canvassers' report, in which letter a question to this effect is asked:—"Your consumption for the year has been stated at so and so; will you be kind enough to inform me whether this is correct?"

Several Voices: Yes, yes, we have read them.

Mr. MARRINER: I believe during the whole of the canvass not half a dozen names have been cancelled on account of having been obtained through mistake; and in most instances the amount of consumption has exceeded that reported by the canvassers. We are assured of an income of £20,000 per annum on that return, and it now remains for you to say how we shall proceed. I am ready to answer any question that may be asked.

Mr. MATTHEWS: I want to know how many directors have taken shares, and the amount paid upon those shares?

Mr. MARRINER: Letters have been sent to nearly all the gas consumers and parties applying for shares; have you received that letter?

Mr. MATTHEWS: No, I have not.

Mr. MARRINER then produced a printed copy of the letter, from which he read the following extract:—

"I can adduce no stronger or more unqualified evidence of the bonâ fide character of the intentions of those concerned than the fact of their

determining not to receive any money in respect of shares until your wishes concerning the undertaking, and the extent to which they might rely on your support in carrying it into effect, had been ascertained. If the result of this inquiry proved contrary to their expectations, then, as there could exist no valid reason for a further prosecution of the plan, it would, as a matter of course, be abandoned; but if, as was confidently anticipated, the result proved confirmatory of their views, the scheme would, as a matter of course, be vigorously proceeded with."

In accordance with this letter we have never asked you for a single shilling. We have had applications for a great number of shares. I do not see why we should be asked whether the directors have paid the full amount of their shares or not. Do directors always do so? The directors have qualified by taking fifty shares each; and they are prepared to take more, but they have no wish to take more than what is necessary to qualify them until your wishes are fully ascertained?

Mr. MATTHEWS: I came here, not in the spirit of opposition, but only to seek for information.

Mr. POTTER: Are the directors merely provisional, or will they submit to be elected by the body of the shareholders at large?

Mr. MARRINER: Most undoubtedly they will. I believe there is no director on that board but has the best intentions with regard to the parish. The directors cannot remain at the board after the first general meeting unless it is your wish. If you wish to have them retire, there is not one of them but will do so in favour of any persons the shareholders may think will serve their interests better.

Mr. POTTER: The reason I put the question is this—we have had before our eyes the tricks played by railway companies, and I am anxious that the people of Marylebone may not be subjected to any such tricks or frauds on the part of a gas company.

Mr. MARRINER: At the last meeting of the board the question was fully discussed. It was then agreed that the board should, as far as practicable, consist of gentlemen connected with the parish; and that the present directors would retire in favour of any persons whom the shareholders might prefer. I could mention one who has done so already.

Mr. POTTER: I should wish to know who he is?

Mr. MARRINER: It is Mr. Williams. In another letter he states that he will be happy to give the company every support in his power.

Mr. POTTER: Is that Mr. Williams of Macclesfield?

Mr. MARRINER: No; it is Mr. Williams of the late firm of Williams and Sowerby, of Oxford-street.

Mr. MATTHEWS: Will you supply gas of a maximum purity and a high standard of illuminating power? I am rather ignorant as to what scale you go upon as to purity. I understand that the Great Central Consumers' Company made great promises as to purity and brilliancy, but when their quality was tested it was found to be 37 per cent. below that supplied by the old company. I have seen it in print. Now, what is your standard?

Mr. MARRINER: You are not to believe everything you see in print. If you refer to the prospectus you will find that they engage to appoint independent inspectors to arbitrate between themselves and the public as to the quality, quantity, and brilliancy of the gas.

Mr. MATTHEWS: If you increase the brilliancy you cannot give the gas at the same price.

Mr. MARRINER: I am not a gas engineer, and, therefore, I cannot answer that question. But will you be content if you get better gas than you have now? (Cries of "Hear, hear," and "Yes, yes.")

The CHAIRMAN: If any of you have observed the gas now supplied you will find that some of it is supplied by the Western Company and some by the Imperial, and there is as much difference between the two as between a farthing rushlight and a good wax candle.

Mr. RICHARDSON: I cannot let that pass; for at the commencement you said you would not let anything but truth be asserted. What you say is not fact. I will make no further remarks.

The CHAIRMAN: Your general remarks do not appear to be very exact. Your assertions in those printed letters are tantamount to your assertions now. Let any man with eyesight go to the road at the top of the Grove, on the right-hand side, and he will have convincing proof of the badness of the gas. (No, no.) No! Why, the thing is rascally. (Laughter.)

Mr. CONCANNON: There are two monopolies which claim payment from one individual for another's debts. The first is the company which manages the dirty water, and the next that which provides dirty gas. I want to know whether the new company will refuse to supply gas to an incoming tenant unless he pays the arrears that may be due by the person who left?

Mr. MARRINER: Certainly not; let every man pay his own debts. (Hear, hear.)

Mr. CONCANNON said it was with great difficulty he could get the gas put on at his place, because the former occupant (a shoemaker) ran away, and did not pay for his gas.

Mr. PEARSE: How long ago?

Mr. CONCANNON: I will not answer that question.

The CHAIRMAN: Will the gentleman tell me how long ago? I have been served in the same way, but I doesn't care a d—n for nobody—(roars of laughter, and "Oh, oh!")—and what I says I'll stick to. (Renewed laughter and confusion.)

Mr. CONCANNON: I have no objection to answer the question, or to give the number of the house and the time. It was last August, No. 427, Oxford-street.

Mr. GREEN: I want to know is there any amount of capital subscribed to this new company, and when there will be a deed of settlement?

Mr. MARRINER: No shares have been allotted. Shares were applied for last week by a party going out of town, who wanted to pay the deposit for himself, and we have refused to take a single shilling until there is a sufficient amount of shares subscribed to place the success of the undertaking beyond a doubt. Every farthing hitherto expended has been out of our own pockets. The whole affair depends entirely on yourselves. It is altogether in your own hands.

Mr. CONCANNON said the great question which the ratepayers had now to consider was whether the new company was likely to give them a better and cheaper article than they had at present. It appeared to him that that could be done, and he hoped the parishioners would work together, honourably, to get rid of one of the remaining monopolies. (Cheers.) It mattered not to the ratepayers whether the writer of any paper chose to say, "You shall put your hand in your pocket and pay more for an article than it is worth, in order to compensate vested rights, lest you should disturb certain owls which are sure to screech." (Laughter.) The ratepayers should look after their own interests, and organize themselves to put down monopoly.

Mr. RICHARDSON: The gentleman who has just sat down supposes the possibility of establishing a new company, that shall prosper and prove beneficial to the parish generally. I think, however, that, from the many failures that have already occurred, there is no probability of such a result. It is well known that, during the last fifteen or sixteen years, seven or eight gas companies have started, and only three of them came to maturity, namely, the *Western*, the *London*, and the *Great Central Gas Company*.

Mr. EDWARD SMITH: When I signed the requisition for calling this meeting I did so for the purpose of inquiring from the right parties the position in which this new company would be placed before the parish. As the inspector to the old company, from which there is so much opposition, is here I want to know from him why he is present.

Mr. RICHARDSON: I want to show the position of the old companies.

Several Persons: We do not want to know the position of the old companies.

Mr. RICHARDSON: There is the London Company, which spent a great sum to establish themselves, and now their position was not worth sixpence. There is the *Western Company* ditto. And what are you now to expect from a parcel of upstarts? (Order.)

Mr. E. SMITH: I must call the gentleman to order. He says we are a parcel of upstarts.

The CHAIRMAN said the expression was decidedly out of order.

Mr. RICHARDSON: I shall confine myself to your own prospectus. I want to know what is your maximum of illuminating power?

Mr. BELTON (a greengrocer): What is your maximum?

Mr. RICHARDSON: I shall take my maximum out of the heart of the cabbage. (Great laughter.)

Mr. BELTON: I am sorry to find Mr. Richardson coming forward with slang language. The publications sent round by the *Imperial* are most disgraceful. Do they suppose that monopoly can be supported by such efforts, and at the suggestion of Mr. Richardson?

Mr. RICHARDSON: This has nothing to do with the question.

Mr. BELTON: I suppose he thought certain parties in the vestry were inclined to support him in the extravagant charge he wished to make the consumers pay. Do you think we should now be without a cheap supply of this useful article if it were not for the efforts of this man Richardson? Do you think any other body of men would have suffered such restrictive clauses to be inserted in the next contract for supplying the public lights?

Mr. RICHARDSON: Will you allow these personal observations to be made, Mr. Chairman?

Mr. BELTON: "Let the galled jade wince, our withers are unwrung." I will let him know that I am in a better position than to be engaged in doing the dirty work of the Imperial Gas Company. A friend of mine gave me a prospectus of the *London* Company, from which it appeared that they were only charging £3 for what the *Imperial* Company were charging £4. 4s. for. I fought them on that question, and, if I did not succeed, it was in consequence of the statements and work of Mr. Richardson and his party.

Mr. PEARSE rose to address the meeting, but was interrupted by

The CHAIRMAN, who asked him if he was a ratepayer?

Mr. PEARSE: I am.

Several Voices: Where? where?

Mr. PEARSE: Cumberland Market.

Mr. E. SMITH: That is out of the parish.

Mr. PEARSE: I belong to four companies paying rates in the parish.

Mr. E. SMITH (landlord of the house where the meeting was held): I shall be obliged to move a resolution for his expulsion.

A gentleman suggested that it would save the time of the meeting, and prevent confusion, if some one moved a resolution. At present there was no motion before the chair.

Mr. CONCANNON then moved a resolution approving of the new company, and pledging the meeting to give it their best support.

Mr. BELTON seconded the motion.

The CHAIRMAN (sarcastically): Look at that beautiful light which is before you. The company that provides that light have not only bound you down to pay for it for a certain time, but they also want to prevent you from having any other light in the parish.

Mr. RICHARDSON: I will not stand that. There are four companies in the parish already.

Mr. PEARSE: I will prove that the statements made by the chairman are not founded in fact. The Equitable, Chartered, and Western occupy part of Oxford-street, the London Company Regent's-park, and the Imperial the remainder.

The CHAIRMAN: If you refer to the proceedings of last Saturday you will find that one of the vestry (not one of those sent in by the parishioners, but one of the old ones) said it was one of the clauses that a new company could not get in without the payment of a certain heavy fine. Now, we want to get this restriction done away with. Is it for that beautiful light you see before you that we are to be placed under those restrictions? If you do not make up your minds to support the new company, you must be content with a farthing rushlight.

Mr. RICHARDSON: The light produced here is 37 per cent. better than that of the Central Gas Company. I can produce better gas

than they can for 3s. 7d., by cleaning the pipes and using glasses. [There were no glasses on the burners employed in the room.]

Mr. HEWLETT: I think the new company has done something unfair this evening. Our chairman has shown a little one-sidedness. He said nothing but what was in favour of the new company. All I want is cheap gas, fair play, and a fair hearing. I do not care whether the person who wants to speak be a director of another company or not. I have got some capital to invest, and I wish to do so with advantage. If the new company wishes to get a footing, they must not try to obtain it by preventing gentlemen from expressing their opinions. If so, it is not a public meeting. Such a principle, instead of benefiting any new company, will bring destruction on its head. We will not support a company that is afraid to bring its details before a public meeting. It seems to me as if you were afraid of meeting these gentlemen (Mr. Richardson and Mr. Pearse). That gentleman (pointing to Mr. Marriner) said, "If this gentleman (Mr. Pearse) stay in the room I will not speak a word more;" but as soon as the gentleman saw that the room was in favour of free discussion he said, "I have no objection."

Mr. MARRINER: I said I had no objection to Mr. Pearse remaining if it was the wish of the meeting, and he confined himself to facts.

Mr. HEWLETT: Every man has a right to be heard.

Mr. PEARSE: It is un-English not to hear every man. I hope the reporters will state that gentlemen are not allowed to speak—that those who have a right to do so are put down by the chairman.

Mr. MARRINER: I beg to observe, in reply to a remark made by that gentleman (Mr. Hewlett), who said that we were fearful lest any information should ooze out from other companies, that the Marylebone Gas Consumers' Company courts the fullest inquiry; we have no desire to cloak anything, but to leave the issue in your hands. (Cheers.)

Mr. PEARSE: I deny it.

Mr. MARRINER: The man who conceals the truth is guilty of a lie. Will Mr. Pearse favour me with one of his last publications?

Mr. PEARSE: With great pleasure (handing Mr. Marriner a printed paper).

Mr. MARRINER then read the following extract from Mr. Pearse's circular of Aug. 20:—

"I likewise add, for Mr. Marriner's information, a copy of Mr. W. Eales's first note to me, with my assurance that I always believed Mr. W. Eales, of Campden-hill, and Mr. W. Eales, of Fenchurch-street, to be the same gentleman; and I leave the consumers of gas in St. Marylebone to judge whether Mr. Eales's first impression as to the getting up of the company was the correct one or not."

Now, will Mr. Pearse produce the second letter which he received from Mr. W. Eales, of Campden-hill, in correction of his former letter?

Mr. PEARSE: I do not happen to have it.

Mr. MARRINER: Then, gentlemen, I will read it to you:—

"Campden-hill, April 20, 1851.

"Sir,—When I received your note on the 18th inst., and enclosing your corrected address as to my name, I did not read over the list of names; if I had I should have seen the solicitor's name to be Mr. Holman, of Bedford-row; if so I should then have said what I now take the earliest opportunity of saying, viz., that a more honourable man, or one more incapable of having to do with anything in the shape of a job, there does not exist in the county of Middlesex.

"I am, sir, your obedient servant,

"To Mr. Pearse, Tottenham-court-road." "W. EALES."

Now, if Mr. Pearse possessed a spark of fairness or candour, he would have published that letter which he received in correction of the former. I will now read Mr. Eales's letter to Mr. Holman:—

"Campden-hill, Kensington, April 22, 1851.

"Dear Sir,—I have this moment received your letter, and the prospectus of the proposed gas company. I cannot find words strongly enough to express what annoyance and pain I have felt at the use made of my note and expressions in opposition to the above company when I wrote my note to Mr. Pearse, denying my connection with the company. I had not the slightest idea that you were acting for the company; if I had, I should have felt an honour to have been put on the direction rather than otherwise. "I am, dear sir, yours truly,

"W. EALES."

I now leave it to the meeting to say whether Mr. Pearse has acted the part of a gentleman towards Mr. Eales?

Mr. PEARSE: What, sir! are you the man of railway notoriety—Madrid and Valencia to wit? Don't insult me, sir! (Laughter.)

Mr. RICHARDSON: Unless the directors have shares to a certain amount they are not entitled to form a company.

Mr. HOLMAN, solicitor to the Marylebone Gas Company, said: As soon as the shares are allotted they will be paid upon, and then the directors will take more shares than those necessary to qualify them. A director said to me, "I would take more shares than my qualification now, but I do not like to interfere with the rights of the consumers and parishioners of Marylebone." What is the use of allotting shares unless you determine whether this company shall be established or not?

Mr. PEARSE: The usual course is to allot largely to the directors first.

Mr. MARRINER: I had intended not to take the slightest notice of anything of a personal nature, but Mr. Pearse has twitted me about the Madrid and Valencia Railway. I beg to assure this meeting that I never had, either directly or indirectly, anything to do with that company.

Mr. PEARSE: Nor railways at all?

Mr. MARRINER: Yes, I have suffered much from them. Who has not?

The resolution expressing confidence in the company was then put from the chair and agreed to.

Mr. BELTON moved that the thanks of the meeting be given to Mr. Marriner for the candid and lucid statement which he had given of the position and prospects of the company.

Mr. SMITH said he wished to call the attention of the gas consumers to the enormous sums paid for public lights. If they were satisfied with the explanations given that evening by Mr. Marriner, he hoped the matter would not be allowed to rest there, but that the ratepayers would take it up, and, like the Great Central Company, form themselves into consumers' committees to promote the undertaking. He thought if they made a calculation they would find that £3. 11s. 6d. was paid to the Imperial Company for each light in their public streets.

Mr. PEARSE: And that is vastly too little.

Mr. SMITH: Mr. Pearse said that was too little; but they would remember the old saying, "Show me your company and I will tell you what you are." (Laughter.) Mr. Pearse was a shareholder in three or four different companies, and had an interest in high prices. No street-lamp burned more than 9400 feet.

Mr. PEARSE: 17,500.

Mr. SMITH: Then they would lose money by it. It was, therefore, surprising that they should be frightened at the new company.

Mr. PEARSE: We are not frightened.

Mr. SMITH: If not, why show opposition?

Mr. PEARSE: Only for a little amusement. We have no objection to your success.

Mr. SMITH: Then why not take shares in the new company? Now, it had been proved (and he had felt the iron rod of monopoly himself) that, where £14 or £15 was due for arrears of gas by a person then in Whitecross-street, the old company would not put on the gas unless the occupying tenant paid another person's debt. A person said to him, "You cannot have the gas, Mr. Smith, unless you pay another man's debt;" and after several applications, although he had offered to pay a quarter in advance, they cut off the gas in No. 1, Gower-street, St. Pancras. They did this fourteen times in seven years, which cost him £20. When the London Company wanted to come in, they could not in consequence of some difficulty in the Southampton estate. Mr. Spottiswoode then came to him for his assistance, and he promised his aid in bringing the London Company into the parish. Then Mr. Webb came and said, "O! Mr. Smith, you need not pay in advance now, as you are an old burner." He thanked him for nothing. (Laughter.) The same thing was now attempted, but he hoped the vestry would look sharply after these companies, and show themselves free-traders enough to do away with monopoly in gas. (Hear, hear.) He hoped especially they would not allow the parish to remain under the iron rod of the Imperial Company. They should only allow the company to contract for one year. The company would say, "We will have a contract for three years or none."

Mr. PEARSE: Do not answer for them. You have no right to assume anything of the sort.

Mr. SMITH: If the meeting was satisfied with the explanations given by Mr. Marriner that evening, he hoped they would form themselves into committees, and let it go far and wide that the greatest, richest, and most enlightened parish in the world would not allow itself to be crushed by a monopoly. (Cheers.)

Mr. RICHARDSON: Each lamp burns 17,000 cubic feet instead of 9000, as Mr. Smith has stated; £3. 11s. was received for each light, but the actual cost to the company was £2. 11s. They had to pay £1 per lamp for lighting.

Mr. MARRINER, in responding to the vote of thanks, said the parties connected with the undertaking were men of integrity, and they would be found worthy of the confidence of the parish. (Hear, hear.)

Mr. RICHARDSON said he would not oppose the vote of thanks, but he was not satisfied about the services rendered.

Mr. PEARSE said there were thirteen companies in London, and the dividends on them all did not average more than 4¼ per cent. The Imperial Company had been working for eighteen years before they paid one shilling. They had about 5 per cent. for two years, but the proprietors went without any bonus. They were now in the twenty-eighth year of their existence, and they were receiving 6 per cent. It might be said that that was something; but were they to be always like a door on its hinges without ever gaining any ground?

A Voice: They have too many orators to pay.

The motion was carried unanimously, as also a vote of thanks to the chairman, and the proceedings terminated.

ON THE VALUE OF VARIOUS KINDS OF COAL FOR STEAM PURPOSES.

Some three or four years since the Government appointed a commission, consisting of Sir Henry de la Beche, F.R.S., and Dr. Lyon Playfair, F.R.S., to examine and report upon the coals suited to the steam navy. The first and second reports had already appeared, but it was not until recently that the third and last report has been presented to Parliament. As the subject is one of interest not only to the steam navy, but also to manufacturers employing steam power, we will give a very condensed account of the results obtained by the commissioners in their examination of the various coals submitted to them.

Although the analysis of a coal shows, generally, that the quantities of carbon and hydrogen which it contains materially regulate its economic value, still there are marked exceptions to this rule, showing that, in all inquiries as to the real value of coal for fuel, its economic value as to its evaporative power, by actual trial under the boilers, should be ascertained.

The coals of the Newcastle district are, in general, of very different composition from the Welsh coals. They are characterized by containing a smaller quantity of carbon, but a larger amount of hydrogen. This latter element exercises in this case a very essential importance in their heating powers, and must not be neglected in comparing the analytical with the economic results. As a general rule, subject to marked exceptions, the practical value of the coal rises with the increase of these two combustible elements. Nevertheless, the mechanical conditions of a coal very frequently modify the practical result

to an extent which was scarcely to be expected. The physical condition of a coal, according as it facilitates or opposes the entrance of air for combustion, produces a most marked influence in its evaporative powers, and often determines the practical results obtained from it more than the composition of the coal itself. It is, therefore, not a safe guide to rely wholly on the analysis of a coal, unless, at the same time, practical experiments are found to coincide with the approximative value indicated by analysis.

The examination of thirty-seven varieties of Welsh coal show that, the weight of water evaporated from 212 deg., by one foot of coal varied from 608·78 lbs. the highest, to 392·2 lbs. the lowest; 500 lbs. being about the average. The examination of eighteen varieties of Newcastle coal showed that the weight of water evaporated from 212 deg., by one cubic foot of coal, varied from 529·34 lbs. the highest, to 325·25 lbs. the lowest; the average not exceeding 420 lbs.

The composition of Derbyshire coals now brought to London by railway, and consumed to a considerable extent in the metropolis, is, in many respects, similar to those from Newcastle, but in general they appear to contain rather a smaller quantity of carbon. The weight of water evaporated from 212 deg., by one cubic foot of these coals, is about 350 lbs.

Upwards of twenty-eight varieties of Lancashire coal were also examined, and their composition determined; but in those, as in other cases alluded to, the same exceptional differences due to the variations in their mechanical conditions are observable, although, generally, the analytical value corresponds with that obtained by the boiler experiments. The weight of water evaporated from 212 deg., by one cubic foot of coal, was found to be 445·91 lbs. in the highest, and 326·11 lbs. in the lowest case; the average being about 400 lbs.

An examination of a few Scotch coals showed that, on the average of eight varieties, the weight of water evaporated from 212 deg., by one cubic foot of coal, was about 400 lbs.

The average values of the coals obtained from different localities are expressed in the following table; and, although the averages are deduced from an unequal number of observations, still these are, in most cases, sufficiently large to give an approximative average of value; to this we add the results obtained from an examination of six varieties of "patent coals":—

LOCALITY.	Evaporating power, or number of pounds of water evaporated from 212 deg. by 1 lb. of coal.	Rate of evaporation, or number of pounds evaporated per hour.	Weight in pounds of one cubic foot of coal, as used for fuel.	Space occupied by one ton in cubic feet.
Average of				
37 samples from Wales ..	9·05	448·2	53·1	42·71
17 „ from Newcastle	8·37	411·1	49·8	45·3
28 „ from Lancashire	7·94	447·6	49·7	45·15
8 „ from Scotland ..	7·70	431·4	50·0	49·99
8 „ from Derbyshire	7·58	432·7	47·2	47·45
Patent Coals.				
Warlich's	10·36	457·84	69·05	32·44
Livingstone's	10·03	483·95	65·6	34·14
Lyon's	9·58	409·1	61·1	36·66
Wylam's	8·92	418·89	65·08	34·41
Bell's.....	8·53	549·11	65 3	34·30
Holland and Green's	7·59	470·0	64·8	34·56

REPORT ON THE NATURE AND PRODUCTS OF THE PROCESS OF THE DESTRUCTIVE DISTILLATION OF PEAT.

By Sir Robert Kane,

Director of the Museum of Irish Industry.

Applications having been made by foreign authorities, and by individuals interested in industry in Ireland, for information regarding those processes for converting ordinary peat into valuable commercial products, to which public attention had been so strongly directed by the statements made in Parliament and elsewhere, the propriety of having such experiments instituted as should afford that information was brought under the notice of the Right Honourable the Chief Commissioner of Woods, on the suggestion of his Excellency the Earl of Clarendon; and, his lordship's sanction having been received to proceeding with the inquiry, the experimental examination of the conditions of that process, and of its products, was undertaken and completed by the chemical officers of the museum under my direction; and I have the honour now to report the results of that inquiry, as well as the consequences therefrom deducible.

The process in question, for distilling peat on such a scale as to form a department of manufacturing industry of national importance, has its origin in the special proposition patented by Mr. Rees Reece, to distil the material by the heat generated from its own combustion in high-blast furnaces, nearly similar to those used in the iron-smelting districts. An investigation of the nature and circumstances of such a process should, however, include two essentially distinct features—the one the scientific examination of the results of the process of destructive distillation with the material, peat, which had not, under that point of view, hitherto obtained much notice; the other, the essentially practical consideration of the economy of that process conducted on a scale of manufacturing industry with a view to profit. Of these two subjects of inquiry, although the latter is that on which public attention may be most fixed, and for which information may be most generally sought, yet it is evident that trustworthy and sufficient data for its discussion can be obtained by the actual circumstances and results of the process having been first determined by exact experimental research, and it was therefore necessary to commence the inquiry by the study of the phenomena of the destructive distillation of peat, and the analysis of its products, without immediate reference to any special object of manufacturing speculation.

In this respect it may appear singular that the chemical history of a material of so much practical interest should have remained hitherto almost unnoticed; but the well-understood nature of the peat, intermediate to wood and coal, explains the fact of the special history of its distillation having been neglected. The phenomena of the destructive distillation of wood, and the constitution of its products, had been accurately determined by the labours of many chemists, and that process conducted on the great scale had led to the creation of extensive manufacturing industries of acid (wood vinegar, pyroligneous acid), creosote, wood spirit (naphtha), wood charcoal, &c. On the other hand, the destructive distillation of coal had been long conducted on the great scale for obtaining the gas for illumination, and various collateral occupations had been created by the preparation of the other products of that distillation for commercial uses, as sal-ammoniac and sulphate of ammonia works, naphthaline and gas naphtha, lampblack, cements, &c. These results so fully indicated to chemists what should be the resulting products of distilling peat, that the actual experimenting on that material was neglected, except in a few instances, and indeed, in a scientific point of view, not unjustly, as, during the special inquiries now concluded, but few results of any commercial value have been obtained that are not in accordance with and explainable by the fact of the peat occupying in uses and composition a place intermediate to wood and coal.

This consideration of the analogy of constitution of the different materials employed as fuels, and the consequent similarity of the products of their destructive distillation, is of importance, as it indicates the differences in the results of distilling peat, or wood, or coal, to be not in the nature but in the relative proportions of the products. It is thus of importance to recollect, in reference to subjects subsequently to be considered, that the essential and characteristic feature in the processes for distilling peat is, not the obtaining of new products, but for obtaining the same bodies that had been hitherto obtained from coal or wood, by means of a cheaper and more abundant material, and at a price so much reduced as to bring them into the market under circumstances sufficiently favourable to create a new and lucrative industry.

Such being the general nature of the processes into which it was considered desirable to inquire, I shall proceed to notice the means taken to arrive at satisfactory conclusions. It was necessary to regard,—

1. The selection of the material to be operated on, in order that the specimens obtained should fairly represent the peat from every important locality, and of every characteristic variety.

2. The determination of the phenomena and results of the distillation of the peat in closed retorts, so as to ascertain the nature and quantity of the coke (peat charcoal), as well as the other products.

3. The determination of the phenomena and results of the distillation of the turf with air-blast, so as to burn the coke and represent the conditions of the manufacturing process proposed.

4. The separation and special examination of the several products supposed to possess commercial value.

5. The discussion of the economic conditions of those processes, as compared with the processes by which similar products are obtained from other sources than peat.

For the objects of the present report I have thought it most proper to place in an appendix the detailed descriptions of the varieties of peat operated on, the tables of their constitution, the description in detail of the several series of experiments, and tables of the results, and the discussion of the analytical processes by which the various products were separated from one another and their quantities determined. Referring, therefore, for details to the special report, drawn up with the assistance of Dr. William Sullivan and M. Alphonse Gages, the chemical officers of the museum, I shall in this report limit myself to a more general notice of the course pursued, and of the conclusions to which the results obtained in the inquiry have been found to lead.

The inquiry being carried on in Dublin rendered the selection of characteristic varieties of peat peculiarly easy. The varieties of turf employed, in all twenty-seven kinds, were selected so as to represent as well diversities of constitution as differences of locality. In regard to constitution, three principal varieties were examined—the dense black or brown variety, which forms the lower strata of the deeper bogs, and which approximates closely to coal in composition; the upper or surface turf, which is almost pure moss and bog plants unaltered; and the intermediate moderately dense brown peat, in which the vegetable structure is quite evident, but the individual plants can no longer be separated. The peculiar differences in the results of the distillation of these several kinds of peat will be found fully illustrated in the special tables; but were found to be, upon the whole, confined within such narrow limits as that for technical objects the produce of the distillation of the several varieties of peat may be considered to be almost the same.

The specimens operated on having been thus selected, so as to represent all important qualities of peat, and also all of the localities in which peat occurs, under circumstances favourable to manufacturing industry, it may reasonably be expected that the results obtained may be fairly considered as applicable to any form or kind of the material that is likely to be employed for industrial objects in this country.

It being important that in an inquiry such as the present the nature of the material operated on should be determined with full accuracy, there was instituted, prior to the distilling processes, a complete analysis of each variety of peat to be employed. These analyses had mainly for object,—1. To determine the amount and nature of the mineral ingredient of the peat; 2. To determine the amount and quality of coke to be expected from its perfect carbonization; and, 3. To ascertain, by its exact organic analyses, the proportions of its

ultimate elements, in order to check the quantity of ammoniacal products of its distillation against the proportion of elements of ammonia which the peat actually contained. This investigation of the chemical composition of peat, and of peat ashes from various districts, will be found, in an agricultural point of view, of considerable interest, as not merely the practical utility of the peat ashes themselves as manure, but the application of the peat charcoal, either by itself or as a recipient of animal manures, will be found very materially influenced by the nature and amount of those ashes, which, however, we had obtained hitherto singularly little information of a trustworthy kind.

The sources, qualities, and chemical composition of the organic and the mineral portions of the peat having been thus determined, the next step in the inquiry was to ascertain the precise results of the destructive distillation carried on in close vessels, so as to collect all the products for examination, and to observe all the phenomena of the process. To effect this, a furnace was constructed nearly on the plan of the apparatus for preparing gas by distilling coal. An iron cylinder was laid horizontally, with the flame bed and flues so disposed that the entire cylinder could be made red hot. At the front of the cylinder the charge was introduced, and from the upper part in front a tube passed, carrying the products of the distillation to the condensing apparatus. As it was the object to obtain separately the products of different volatility and different natures, the condensation was effected by a series of large tinned iron vessels, immersed in water, like a series of Wolf's bottles, and from the last vessel the tube passed to a worm contained in a barrel supplied with cold water. In no case was the water in this barrel sensibly warmed, the previous refrigeration having been complete, but the worm was found very useful in arresting small portions of the condensed liquids, which were carried forwards mechanically by the current of gas, and were collected in a small vessel attached where the worm issued from the barrel, and provided with a stopcock for their removal; at the extremity of the tube the gases finally issued, and were generally set on fire as the most simple means of getting rid of them; proper observations, as to their combustibility and constitution, being of course made from time to time.

All the further details as to the construction of the apparatus, and the management of this process, will be found given in the appended special reports. I shall confine myself here to the general results. The object being to ascertain the necessary facts regarding the products of commercial value, the following was the course pursued:—

Specimens of turf representing the several ordinary varieties were separately experimented on, and the results examined.

The products of distillation were collected as,—

1. Charcoal.
2. Tar.
3. Watery liquids.
4. Gases.

The relative quantities produced by 100 parts of peat were found to be:—

	Average.	Maximum.	Minimum.
Charcoal	29·222	39·132	18·973
Tarry products	2·787	4·417	1·462
Watery products	31·378	38·127	21·819
Gases	36·616	57·746	25·018

The peats yielding those proportions of products had been found to contain previous to distillation, as dried in the air, a quantity of hygrometric moisture, and to yield a proportion of ashes in 100 parts as follows:—

	Average.	Maximum.	Minimum.
Moisture	19·71	29·56	16·39
Ashes	3·43	7·90	1·99

The details of these examinations and the tabulated results will be found in the appendix.

The several products of the distillation thus carried on were next specially examined for the several materials of which the quantities and commercial value had been the principal sources of the public interest of this inquiry. The description of the processes by which these bodies were separated from each other, and their quantities ascertained, will be found in the special reports appended. The inquiry, having reference, however, to the technical objects of the process, was carried on by examining the produce of,—

I. Tar, for—1. Volatile oils.
2. Fixed (less volatile) oils.
3. Solid fats, or paraffine.
4. Creosote.

II. Watery liquids, for—1. Acetic acid.
2. Ammonia.
3. Pyroxylic spirit.

III. Gases—For illuminating and heating power.

The following numbers will indicate the results obtained in average. All the details of the processes of separation, and the numbers of the individual experiments, will be found in the special reports.

In seven series of distillation in close vessels there was obtained from 100 parts of peat,—

	Average.	Minimum.	Maximum.
Ammonia	0·268	0·181	0·404
or as			
Sulphate of ammonia	1·037	0·702	1·567
Acetic acid	0·191	0·076	0·286
or as			
Acetate of lime	0·280	0·111	0·419
Pyroxylic spirit	0·146	0·092	0·197
Volatile oils	0·790	0·571	1·262
Fixed oils	0·550	0·266	0·760
Paraffine	0·134	0·024	0·196

It is thus seen that the proportions of those products vary within wide limits, which are determined by differences of quality of the turf or temperature in the distillation. The precise degrees of influence exercised by each of these causes will be noticed specially hereafter.

Several trials were made to determine the amount of creosote present in the tar, but, although its presence could be recognised, its proportion was so minute as to render its quantitative estimation impossible. This circumstance constitutes an essential distinction of peat tar from wood tar, and indicates for the former an inferior commercial value, as the presence of creosote, now so extensively employed, is an element in the estimate of the price of the tar obtained by distilling wood.

It will be understood that the materials indicated in the foregoing table by the names of "fixed" and "volatile oils" are in reality mixtures of a variety of chemical substances of different volatilities and compositions—generally carbo-hydrogens—of which the further separation would be a labour of purely scientific curiosity, without having any bearing upon the objects of the present report. Although, therefore, those liquids were carefully examined, and observations made regarding their chemical history, I shall not embarrass the present report by reference to them in any other point of view than as products of destructive distillation, whose properties, analogous to the highly volatile and to the fixed oils, respectively, may give them a commercial value such as has been represented. I may remark, also, that, as a purely scientific question, the true nature of the solid fatty product is of much interest. The name paraffine has been given to this body, but in some of its characters it appears to deviate from those of the true paraffine, as described by Reichenbach to be obtained from wood tar; those differences should, however, not contravene its commercial uses.

The inquiry so far carried on sufficiently established that the peat, by destructive distillation in close vessels, yielded the several products that had been described, and were identical or closely analogous to those afforded in the distillation of wood or coal. The process in close retorts, however, being not at all that proposed or economically practicable for commercial purposes, it was necessary to proceed to determine whether the same varieties of peat, being distilled in a blast-furnace, with a current of air, so that the heat necessary for the distillation was produced by the combustion of the peat itself, would furnish the same products, and whether in greater or in less quantities than in the process in closed vessels.

For this purpose, the cylinder, which in the former series of experiments had been set horizontally in the furnace, was placed surrounded by brickwork vertically, its mouth projecting a little at top, so that the tube for conveying away the products of the distillation passed horizontally from the top of the brickwork casing to the condensing apparatus. Near the bottom of the cylinder the brickwork left a space where the cylinder was perforated by an aperture $1\frac{1}{4}$ inch diameter, to which the tube of a large forge bellows was adapted. The arrangement thus represented nearly the construction of an iron cupola. The cylinder being charged with peat, of which some fragments were first introduced lighted, and the blast being put on, the combustion spread, and, the cover of the cylinder being screwed down, the distillation proceeded, the products passing with the current of air into the series of condensing vessels, and the gases and air finally being conducted by a waste-pipe to the ash-pit of a furnace, where they were allowed to escape.

By this means there was obtained, on a moderate scale, a satisfactory representation of the condition of air-blast distillation of peat which has been proposed as the commercial process. In so carrying it on several interesting observations were made which will require to be noticed here in a general point of view, referring to the special report appended for details.

First, as to the nature and quantities of the products. The specimens of peat operated on were selected as similar to those employed in the former series, of which the results have been quoted, and the products similarly treated were found to be, from 100 parts:—

	Average.	Maximum.	Minimum.
Watery products	30·714	31·678	29·818
Tarry products	2·392	2·510	2·270
Gases	62·392	65·041	59·716
Ashes	4·197	7·226	2·493

These several products, having been further examined, as in the former case, gave, from 100 parts of peat:—

	Average.	Maximum.	Minimum.
Ammonia	0·287	0·344	0·194
or as			
Sulphate of ammonia	1·110	1·330	0·745
Acetic acid	0·207	0·268	0·174
or as			
Acetate of lime	0·305	0·393	0·256
Pyroxylic spirit	0·140	0·158	0·106
Volatile oils	1·059	1·220	0·946
Paraffine	0·125	0·169	0·086

It is now important to compare these average results with those of the former series obtained by distillation in close vessels; we obtain,—

	Average produce from close distillation.	Average produce by air-blast distillation.
Ammonia	0·268	0·287
or as		
Sulphate of ammonia	1·037	1·110
Acetic acid	0·191	0·207
or as		
Acetate of lime	0·280	0·305
Pyroxylic spirit	0·146	0·140
Oils	1·340	1·059
Paraffine	0·134	0·125

More detailed comparative tables will be found appended; and it is thus seen that, notwithstanding the apparent differences in the nature of the process, and the construction of the apparatus, there is really no serious difference in the results; the products being the same, and not differing more in proportional quantity, whether obtained by close or by blast distillation, than different experiments made with the same apparatus differ amongst one another.

There is thus obtained the very important consequence that we may adopt as applicable to the blast-distillation process all the investigations made regarding the products and circumstances of the process in close vessels, and it is easy to understand why it is so. The blast of air entering the bottom of the cylinder burns the portion of the peat with which it comes immediately into contact, and the heat so produced acts as the heat of an external fire should have acted to carbonize and distil the portion of peat lying immediately above; there is thus in the upper part of the furnace a simple distillation and coking of the peat; but in the lower part a combustion of the peat charcoal as it descends. This latter is, therefore, the fuel of the operation, and is used in the most direct and economical manner, as the coke is used in the cupolas or high furnaces of an iron works.

It was found, however, that, the volatile products of the distillation being in that case intermixed with so large a quantity of air and permanent gases, the condensation of the vapours became far more difficult than in the process with the closed retort; and in the first experiments it was found that very little tar was obtained, and the aqueous liquor was strongly acid, a reaction never observed with the process in close vessels: traces only of pyroxylic spirit were obtained, and altogether the volatile products appeared to have escaped condensation. It was, therefore, found to be necessary, in order to obtain trustworthy results, to provide additional means of condensation, not merely by cooling the products, but by washing the gases evolved, so as to separate the other products diffused through their volume. This was successfully accomplished by washing the gases evolved by contact with a considerable surface of cold water before escaping to the chimney.

There will be found in the special report some interesting details as to the presence of certain bodies associated with the more important products, and which may be considered accidental, as having their origin either in unessential conditions of the process, or in the accidental presence of substances in the peat employed. Thus, in almost every case, the oily products were found to be contaminated by the presence of a quantity of sulphur, derived from gypsum or from iron pyrites in the peat. This sulphur gave to the oily products a disagreeable odour, especially if burned; and its removal required careful and peculiar chemical management. Similarly the quantity of ammonia obtained in the watery liquors was liable to variation, according as the proportion of azotized oily bodies changed with the circumstances of the distillation, as the peat, in its volatile tarry products, contained the same organic bases, rich in nitrogen, and capable of giving ammonia when decomposed, that are found in the coal-gas tar.

Another peculiarity in the results of the air-blast distillation is one which may be found of importance in case the process becomes commercially employed. Among the products of the distillation is the butyric acid, an acid of animal origin (in butter), but also of occurrence as a product of peculiar fermentation. It is of a very high interest to find this acid associated with the acetic acid, when produced by destructive distillation, but it is remarkable that it is produced in much larger quantities in the air-blast distillation than when the process is carried on in close vessels. In the former case its proportion is such as to affect materially the characters of the acetic acid, from which its perfect separation is by no means easy. I am not aware what processes may have been devised for the purification of the rough acetic acid in the works projected by Mr. Reece; but it is certain that even more special attention will be necessary than in the case of the similar acid obtained by the distillation of wood.

It may thus finally be concluded that, so far as the nature and quantities of the substances reported by Mr. Reece to be obtainable by the distillation of peat in air-blast furnaces, there appears no doubt of the feasibility of the results he proposes to obtain. It is, however, also found that there are associated with these products others which are impurities, whose separation may be difficult, and requiring special processes, which will deserve to be taken into account in considering the applicability of Mr. Reece's processes on the great scale.

Commercial Application of the Process.—In 1849, Mr. Reece, having brought his experiments on the destructive distillation of peat to a satisfactory issue, patented his invention of the process of distilling peat in an air-blast, and thereby obtaining certain products. His published specification will be found in the appendix, and it will be seen that he claims—first, causing peat to be burned in a blast, so as to obtain inflammable gases and other products; and secondly, obtaining products of peat, which he terms paraffine, and liquid paraffine, by operating on tar or pitchy matter, produced from peat, as described. Mr. Reece's patent includes the description of the furnace and condensing apparatus he proposes to employ, but does not claim any particular construction.

In order to be able more satisfactorily to compare the results of Mr. Reece's operations with those of the experiment conducted under my own superintendence, I communicated to him the fact of my being engaged with the present inquiry, and invited him to afford information on some points which I suggested. I have to thank Mr. Reece for his immediate and satisfactory attention to my request; and I have placed in the appendix copies of my application and of his reply, to which I shall here only make general references.

The experiments which were carried on at Newtown Crommelin, in the north of Ireland, by Mr. Reece, for the purpose of determining the commercial utility of his process, as referred to in his replies, have apparently afforded all the practical evidence that had been obtained by him of the amount and nature of the products. In the prospectus of the company proposed by Mr. Reece these experiments were quoted, and reported to have been superintended by Dr. Hodges, Professor of Agriculture in the Queen's College, Belfast; and, being desirous to obtain the fullest information as to their nature, I addressed to Dr. Hodges some inquiries, to which he obligingly replied. His answers will be found appended, and I shall refer to them on occasion. We have thus, in the practical results of the distillations at Newtown Crommelin, the grounds of the calculations of quantities of produce which Mr. Rees Reece has put forward, and they may be thus directly compared with the results of the investigation conducted in the laboratory of the Museum.

The quantities and nature of the products, as certified by Dr. Hodges, in the one trial which he superintended, compared with the Museum average results, reduced to the same standard (Dr. Hodges' acetic acid having been 25% of real), are:—

	Prof. Hodges.		Museum.	
	From a ton.	From 100 parts.	From a ton.	From 100 parts.
Sulph. of ammonia	22⅝ lbs.	1·000	24·$\frac{8}{16}$ lbs.	1·110
Acetic acid, real hydrated	7¼ lbs.	·328	4⅝ lbs.	·207
Wood naphtha	83¼ ozs.	·232	50½ ozs.	·140
Tar	99½ lbs.	4·440	53¾ lbs.	2·390

It hence is evident that the quantity of ammonia obtained at Newtown Crommelin is rather under that obtained at the Museum; but the produce of acetic acid, tar, and naphtha, has been found in average decidedly inferior to that stated, although the maximum results found in particular trials have approximated closely to Dr. Hodges' numerical results. There having been, however, apparently but a single trial so accurately followed up at Newtown Crommelin, it is necessary to contrast the results of the Museum experiments more specially with the quantitative produce expected by Mr. Reece, as given in the prospectus of the company to be formed for working his process.

(To be continued.)

Gas Lighting in South America.—The first gas work on that continent is about to be erected at Rio de Janeiro. The contractors have entered into engagements with the proprietors of the Boghead colliery for a large annual supply of their celebrated cannel coal.

New York.—The Manhattan Gaslight Company are extensively enlarging their works. Two telescopic gasometers are in course of construction, for which large excavations have been made; they are each of a capacity equal to 290,600 cubic feet, and the iron tanks in which they float will be of a size sufficient to contain 4650 tons of water. To each tank there will be six iron columns, 3 feet in diameter, and 50 feet high, weighing about 8 tons each. A retort-house 140 feet by 30, and a coke-shed 120 feet in length, have been built, and the foundation has been laid for an engine-house. From sixty to one hundred men are employed in laying pipes through the streets; thirty miles have been laid in the course of this season. About two-thirds of cannel coal is used to one of Liverpool caking coal.

Solid Gas..—It may be recollected that some time ago a spring of mineral oil, like those in Persia and other countries, was found in a mine in Derbyshire. On distillation it was ascertained to be an oil of great value for the lubrication of machinery, and was much used for that purpose in Manchester, but the supply ceased. The attention of Mr. Young, of that town, was then directed to the subject. From its connection with the coal district, he believed that it might be produced therefrom by chemical means. The naphtha produced by the distillation of coal differs entirely from that found in the natural spring referred to. Mr. Young, however, has discovered a process by which he entirely converts the volatile principle of coal into a liquid oil, and into a substance called paraffine. This substance had never previously been produced from coal, though it had from the distillation of wood. If paraffine be heated it is converted into olefiant gas—the illuminating principle of the ordinary gas which lights our streets and houses. It may, therefore, be appropriately termed "solid gas." The oil produced is also paraffine in a different condition, and thus Mr. Young, by distilling coal at a low heat, has succeeded in producing solid and liquid gas. The importance of this discovery was pointed out by Baron Liebig in a recent work, wherein he describes the solidification of gas as one of the greatest wants of the age. Mr. Young has produced the desired result by a process preliminary in its stage to that hinted at by the great chemist, and in weight the results obtained by him tally exactly with what they would in the manufacture of common gas. In practice nothing can be more simple than this discovery. The coal introduced at one end of a retort is screwed out in the form of coke at the other, while the liquid and solid products of distillation come away from a separate opening. If successfully carried out on a large scale, Mr. Young's process will yield very important results, and among these may be specified the economical production of coke for our railways, in the manufacture of which vast quantities of gas are now entirely wasted.—*Times.* [It is understood that this process consists in the long distillation of coal at very low temperatures. A large manufactory has been established at Bathgate, near Edinburgh, where the Boghead cannel coal is thus treated, and very valuable products obtained.]

Biddle's Chimney-glass Cleaner.—Next to good gas and good burners, a clean chimney-glass is the most essential requisite to the diffusion of a good light. This little instrument, lately registered by Mr. Biddle, is a great improvement upon the old one, and may be applied to glasses of all shapes and forms.

Philippe Lebon.—A bust of this French engineer has been placed in the hall of the Conservatoire des Arts et Métiers at Paris. The introduction of lighting by gas is claimed for him by his countrymen.

Share List.

THE PRICES QUOTED ARE THOSE AT WHICH THE LAST SALES HAVE BEEN MADE.

The Companies whose names are printed in italic type are incorporated by Act of Parliament.

Number of Shares issued.	Amount per Share £	Name of Company.	Amount paid up per Share £ s. d	Dividend per Cent. per Ann. £ s. d	Price. £ s. d
		ENGLAND.			
		Aberdare			
		Aberystwith			
		Abingdon			
		Accrington £7000		5 0 0	
		Albrighton			
		Alcester			
		Alford, Lincolnsh.			
		Alfreton			
		Alnwick			
		Alston Moor			
250	10	Alton	10 0 0	5 0 0	10 0 0
800	5	Altrincham	5 0 0	4 0 0	
		Amlwch			
160	10	Ampthill	10 0 0	5 0 0	10 0 0
350	10	Andover	10 0 0	6 0 0	11 0 0
		Appleby			
		Arundel			
		Ashbourn, Derby			
		Ashburton			
		Ashby-de-la-Zouch			
		Ashford, Kent			
1600	25	*Ashton-under-Lyne*	25 0 0	10 0 0	52 0 0
		Atherstone			
		Axminster			
225	20	Aylesbury	20 0 0	5 0 0	21 0 0
		Aylsham, Norfolk			
		Bacup, Yorkshire			
		Bakewell			
		Baldock			
140	25	Banbury	25 0 0	10 0 0	50 0 0
		Bangor			
500	5	Barking, Essex	4 10 0	5 11 0	5 0 0
250	10	Barnard Castle	10 0 0	5 10 0	10 15 0
		Barnet			
		Barnsley £6000		7 10 0	
100	20	Barnstaple	20 0 0	7 10 0	25 0 0
		Barton			
120	25	Basingstoke	25 0 0	8 0 0	28 0 0
2400	20	*Bath*	16 0 0	6 0 0	25 to 30
		Battle £2000		6 0 0	
56	26½	Bawtry	26 10 0	5 0 0	25 0 0
		Beaumaris			
		Beccles, Bungay, and Lowestoft			
		Bedford			
		Bedworth			
		Belford			
		Bedale, Yorkshire			
		Belper			
		Beminster			
		Berkhempstead			
700	5½	Berwick-on-Tweed	5 10 0	6 8 0	5 15 0
		Beverley			
		Bewdley			
280	10	Bideford	10 0 0	6 0 0	10 10 0
		Biggleswade			
160	10	Bicester	10 0 0	5 0 0	10 0 0
		Bilston £15,100		8 0 0	
		Billericay			
		Bingley £7400		4 0 0	
		Birkenhead £70,000	35 0 0	3 0 0	35 to 37
2400	50	*Birmingham and Staffordshire*	50 0 0	10 0 0	93 to 94
	25	*Ditto*, new shares	7 10 0	10 0 0	12 0 0
928	75	*Birmingham*	75 0 0	10 0 0	139 to 141
		Bishop's Auckland			
		Bishop's Stortford			
		Blackburn £30,000		10 0 0	
		Blandford			
		Blythe			
		Bodmin			
		Bognor			
		Bolton £38,582		9 19 5	
		Boroughbridge			
		Boston £8000		10 0 0	
260	10	Bourn	10 0 0	5 0 0	
		Brackley			
		Bradford, Wilts			
		Bradford, Yorksh. £45,000		9 10 0	
		Brampton, Cumb.			
		Brandon, Suffolk			
		Brecon			
		Bridge-end, Glam.			
		Brierly Hill			
2250	20	*Brighton*	20 0 0	5 0 0	14 to 15
1125	20	,, new shares	16 0 0	5 0 0	
		Brighton and Hove £50,276			
4250	20	*Bristol*	20 0 0	9 0 0	37 0 0
1725	25	*Bristol and Clifton*	25 0 0	6 0 0	25 0 0
		Brixham			
		Braintree			
750	50	*Brentford*	50 0 0	6 0 0	44 to 46
800	25	,, new shares	11 0 0	6 0 0	11 0 0
		Brentwood			
		Bridgwater £6000		3 0 0	
400	10	Bridlington	10 0 0	5 0 0	10 0 0
		Bridport			
		Brigg			
		Broadstairs			
100	50	Bromley, Kent	50 0 0	6 0 0	52 10 0
		Bromsgrove			
		Broughton			
120	10	Bruton	10 0 0	4 0 0	8 0 0
100	25	Buckingham	25 0 0	5 0 0	25 0 0
		Bungay (see Beccles)			
		Burford			
		Burnley £19,946		4 10 2	
		Burslem			
		Burton-on-Trent			
		Bury, Lane. £6570			
		Bury St. Edmund's		5 0 0	
		Buxton			
		Callington			
		Calne, Wilts			
		Camborne			
		Cambridge £34,560		9 0 0	
240	50	*Canterbury*	50 0 0	6 0 0	
240	25	*Ditto*, second issue	25 0 0	6 0 0	57 to 58
		Cardiff £12,000		7 10 0	28 to 29
		Carmarthen			
		Castleford			
		Chapel on the Frith			
		Chard			
		Chatham (see Roch.			
		Chatteris			
		Cheadle			
		Chelmsford			
		Cheltenham £18,732		8 10 0	
		Chepstow			
		Chertsey			
230	10	Chesham, Bucks	10 0 0		
		Chester			
		Chester-le-Street			
		Chesterfield £13,123		4 17 6	
240	25	Chichester	25 0 0	6 0 0	30 0 0
		Chippenham			
		Chipping Norton			
		Chirk			
		Chorley			
		Chudleigh			
		Cirencester			
		Clifton (*Bristol and*			
		Cleckheaton, York.			
		Clitheroe			
		Cockermouth			
		Colchester			
		Collumpton			
		Colne, Lancashire			
		Coleford, Gloucest.			
		Coggeshall			
		Congleton £5000		5 0 0	
		Cowbridge			
		Corsham			
800	25	*Coventry*	25 0 0	6 0 0	20 0 0
		Cowes			
		Crewkerne			
		Croydon £30,000		5 0 0	
		Cranbrook £1900		5 0 0	
		Crayford			
		Crediton			
		Crewe, Cheshire			
		Cricklade			
		Darlaston			
		Darlington			
250	20	Dartford	20 0 0	7 10 0	27 0 0
		Dartmouth			
125	20	Daventry	20 0 0	6 0 0	24 8 0
		Dawley, Shrop.			
		Dawlish			
		Dedington			
500	6	Denbigh	6 0 0	5 0 0	6 0 0
820	10	Deptford	10 0 0	5 0 0	4 10 0
325	50	*Derby*	50 0 0	10 0 0	
90	20	Dereham (East)	20 0 0	4 10 0	
1000	5	*Dewsbury*	5 0 0	10 0 0	8 12 6
		Devizes			
4000	5	*Devonport*	5 0 0	6 0 0	6 5 0
		Doncaster			
280	25	Dorchester	25 0 0	5 0 0	30 0 0
120	25	Dorking	20 10 0	5 0 0	21 10 0
		Douglas, Isle of M.			
209	56½	*Dover*	56 10 0	4 15 4	55 0 0
		Downham			
		Driffield			
		Droitwich			
600	20	*Dudley*	20 0 0	4 0 0	15 to 16
		Droylsden			
		Dunmow			
		Dunstable			
		Durham			
276	9	Dursley, Gloster	9 0 0	5 10 0	8 0 0
		Eastbourne			
		East Grinstead			
		Elland			
		Ellesmere			
		Enfield			
300	19	Epsom and Ewell	19 0 0		
		Evesham			
		Exeter £40,000		10 0 0	
		Exmouth			
		Eye, Suffolk			
64	25	Fakenham	25 0 0	5 0 0	25 0 0
		Falmouth			
		Fareham			
120	25	Farnham	25 0 0	10 0 0	42 0 0
		Farringdon			
		Faversham			
		Ferrybridge			
		Fleetwood			
		Folkestone			
		Fowey			
240	5	Framlingham	5 0 0	5 0 0	5 0 0
		Frome			
		Garstang			
		Gillingham, Dorset			
		Glastonbury			
		Glossop £10,000		9 0 0	
1000	25	*Gloucester*	25 0 0	7 10 0	28 0 0
		Gomersal			
		Godalming			
		Gosport			
		Grantham			
1000	20	Gravesend	20 0 0	5 0 0	21 0 0
1000	10	*Great Grimsby*	8 0 0	8 0 0	10½ to 11
	25	Guildford	25 0 0	4 0 0	20 0 0
		Guisborough			
		Hadleigh			
		Hales Owen			
300	6	Halesworth	6 0 0	7 10 0	5 10 0
		Halifax £15,000		10 0 0	
		Halstead			
		Hampton Court			
		Harrogate £10,000		5 0 0	
		Hartlepool £15,137		7 10 0	
		Haslingden, Lansh.			
330	50	Hastings and St. L.	50 0 0	6 0 0	60 0 0
		Haverfordwest			
		Haverhill			
		Haworth, Yorks.			
		Hayle			
		Helstone			
		Hemel Hempstead			
300	10	Henley-on-Thams.	10 0 0		
		Hereford £5300		4 0 0	
		Herne Bay			
270	10	Hexham	10 0 0	7 0 0	12 0 0
		Heywood £10,000		5 0 0	
		Highworth (Wilts)			
230	10	Hinckley	10 0 0	5 0 0	7 0 0
		Hindley, Lancash.			
		Hitchen			
		Hythe			
		Hoddesden			
		Holbeach			
		Holmfirth £8880		3 10 0	
		Holyhead			
		Holywell (see British Provincial)			
		Honiton			
		Horncastle			
	10	Houghton-le-Sprg.	10 0 0	8 0 0	
		Horsham			
		Howden			
		Hull, Sculcoats (see British Provin.)			
		Hull, £11,712. 10s.		5 0 0	
		Hunmanby			
210	10	Hungerford	10 0 0	5 0 0	10 0 0
		Huddersfield			
520	5	High Wycombe	5 0 0	6 0 0	5 0 0
		Ilminster			
		Ilford			
		Ilfracombe			
		Ironbridge			
1400	10	*Ipswich*	10 0 0	8 0 0	15 0 0
1400	10	,, new shares	7 10 0	8 0 0	
800	25	*Isle of Thanet* (Ramsgate&Mar.)	20 0 0	5 0 0	20 to 21
		Kendal £9100		8 15 0	
		Kenilworth			
		Keswick			
		Kettering	25 0 0	5 0 0	25 0 0
100	25	*Kiddermins.* £10000		5 0 0	
		King's Langley			
		Kington, Hereford			
		Kirkby Lonsdale			
		Kirkham, Lanc.			
		Knutsford			
		Lancaster			
		Llanelly £3000		5 0 0	
		Llandovery			
		Leamington Priors £22,500		6 0 0	
		Leatherhead			
		Ledbury			
		Leeds Old Comp. old stk., £60,300		10 0 0	
		new ,, £23,775		6 0 0	
		Leeds New £60,000		10 0 0	
		Leek			
		Leicester...£35,230		7 0 0	
		Leigh			
125	20	Leighton Buzzard	20 0	5 0 0	
		Leominster			
		Leyburn, Yorksh.			
		Liskeard			
330	25	Lewes	25 0 0	5 0 0	23 0 0
		Lincoln £8000		10 0 0	
		Leyland, Lancash.			
		Littlehampton			
250	20	Lichfield	20 0 0	10 0 0	30 0 0
		Liverpool United	100 0 0	9 0 0	186 to 188
		,, ¼ sh.	25 0 0	9 0 0	46¼ to 47
		Langport			
		London Comps.—			
5000	40	*British*	18 0 0	5 0 0	12 to 13
		,, debentures £46,300		4 0 0	
5000	20	,, Provincial—(Holywell, Hull, Norwich, Potteries, Trowbridge)	20 0 0	7 0 0	17 to 19
	20	,, Prov., new	10 0 0	7 0 0	7 to 9
	25	*Commercial*	25 0 0	6 0 0	22 to 24
	25	,, new shares	15 0 0	6 0 0	part to dis
	25	,, ,,	2 10 0	6 0 0	part to dis
12,000	50	*Chartered*	50 0 0	6 0 0	44 to 45
6000	50	,, new shares	10 0 0	6 0 0	8 to 9
2000	150	*City of London*	150 0 0	4 0 0	120 to 125
4000	50	*Equitable*	50 0 0	2 10 0	26 to 27
		,, debentures £46,000			
10,000	20	European—(Amiens, Boulogne, Caen, Havre, Nantes, and Rouen)	20 0 0	5 0 0	12 to 14
	20	,, do. new	5 10 0	5 0 0	4 to 4½

Number of Shares issued.	Amount per Shar	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
15,000	10	*Gt.Cntl.Consumers*	10 0 0	5 0 0	
8000	50	*Impl.Continental* —(Amsterdam, Aix-la-Chapelle Antwerp, Berlin, Bordeaux, Brussels, Cologne, Frankft., Ghent, Haarlem Hanover, Lille, Marseilles, Rotterdam, Toulouse, Vienna)	42 0 0		41 to 43
7000	50	„ new shares	41 0 0		60 to 65
	50	„ third issue	42 10 0		55 to 60
10,000	50	*Imperial*	50 0 0	6 0 0	68 to 70
3000	50	„ new shares	40 0 0	6 0 0	55 to 57
		„ debentures £50,500			
4000	40	*Independent*	40 0 0	6 0 0	46 to 47
3000	50	*London*	50 0 0		7 to 9
6000	25	„ preference	7 10 0	6 0 0	7¼
3000	50	„ 2nd do.	50 0 0		15 to 18
9000	50	*Phœnix*	49 0 0	4 10 0	27 to 28
1000	100	*Ratcliff*	90 0 0	5 0 0	60 to 65
4000	25	*South Metrop.*	25 0 0	6 0 0	22 to 23
9000	50	UnitedGeneral—(Cork, Dublin, Limerick)	50 0 0	2 0 0	16 to 18
12,500	20	Western	18 0 0		7 0 0
		Lostwithiel			
		Loughborough			
240	25	*Louth*	25 0 0	6 0 0	26 10 0
		Lowestoft (see Bec.			
611	5	Ludlow Union	5 0 0	6 0 0	5 0 0
		Luton			
		Lutterworth			
		Lyme Regis			
		Lymington			
		Malmesbury			
		Macclesfield 32,000		3 15 0	
		Maidenhead			
300	50	*Maidstone*	50 0 0	10 0 0	90 0 0
		Maldon			
		Marlborough			
		Malton (New)			
		Malvern			
		Manningtree			
		Mansfield £5000		10 0 0	
		March			
		Margate (see I. of T.			
		Market Deeping			
		Market Drayton			
132	25	Market Harboro'	25 0 0	6 0 0	30 0 0
		Market Raisin			
		Market Weighton			
		Marlow			
370	10	Maryport	10 0 0	6 0 0	12 0 0
		Melksham			
		Melton Mowbray			
		Merthyr Tydvil			
		Mere			
		Middleton £9033		5 0 0	
		MidsummerNorton			
		Middlesboro'			
		Mildenhall			
		Mitcham			
		Mold			
700	10	Monmouth	10 0 0	5 0 0	
		Monk Wearmouth			
		Moreton in Marsh			
		Morley			
		Mottram			
		Nantwich			
		Neath			
		Needham Market			
		Newark £5000		10 0 0	
250	20	Newbury	20 0 0	5 0 0	20 0 0
13,000	5	Newcastle & Gateshead Union	5 0 0	8 0 0	8 0 0
		Newcastle-under-Lyne £6200		4 0 0	
600	5	Newmarket	5 0 0	6 0 0	5 0 0
		Newnham, Glost.			
		Newent			
		New Mills & Hayfield £2115			
		Newport, M. £11720		8 0 0	
320	50	*Newport, Isle of W.*	38 0 0	4 0 0	19 to 20
		Newport Pagnell			
		Newport, Salop			
		Newton Abbot			
		Newton, Lanc.			
		Northallerton			
		North Walsham			
542	20	*Northampton*	18 0 0	10 0 8	27 0 0
		Northfleet			
		Northwich			
		Norwich (see British Pro. £40,000		7 0 0	
900	50	*Nottingham*	50 0 0	10 0 0	
900	50	New shares		10 0 0	
		Nuneaton			
		Oakham			
		Oakhampton			
200	10	Odiham, Hants	10 0 0	3 10 0	10 0 0
		Oldham			
		Olney			
		Ongar			
		Ormskirk			
		Otley, Yorkshire			
		Oundle			
150	120	*Oxford*	120	8 0 0	260
		Over Darwen £8000		5 0 0	
		Padstow			
		Pately Bridge, Yrk.			
250	20	Penrith	15 0 0	6 10 0	21 0 0
		Penryn			
		Penzance			
200	10	Petworth	10 0 0	8 0 0	12 0 0
		Petersfield			
		Pickering			
3000	10	*Plymouth*	10 0 0	6 0 0	11 0 0
		Pocklington			
		Pontefract			
		Pontypridd			
400	10	Poole	10 0 0	5 0 0	10 0 0
		Port Madoc			
600	50	*Portsea Island*	53 0 0	5 0 0	45 to 47
400	10	Prescott	9 0 0	4 13 4	7 0 0
		Preston £52,500		10 0 0	
		Pwllhelli			
		Pudsey £12,000		5 0 0	
		Radcliff and Pilkington £9000		4 12 10	
		Ramsay, I. of Man			
		Ramsgate (see Isle of Thanet)			
		Ravenglass			
1000	10	*Reading*	10 0 0	3 0 0	7 0 0
500	20	*Reading Union*	20 0 0	6 0 0	17 0 0
		Redditch			
		Redruth			
		Reigate			
		Retford (East)			
		Rhyl			
		Richmond (Surrey)			
		Ripon			
		Rochester and Chatham £20,000		6 0 0	
		Rochford			
		Rockingham			
		Romford			
		Ross			
215	25	*Rotherham*	25 0 0	6 0 0	40 10 0
		Royston			
		Ruabon			
		Rugby			
		Rugeley			
		Runcorn £11,000		7 10 0	
		Ruthin			
500	10	Ryde	10 0 0	6 0 0	12 0 0
		Rye			
		Romsey			
		Saddleworth			
225	20	Saffron Walden	20 0 0	3 15 0	19 0 0
		St. Austel			
		St. Asaph			
		St. Colomb			
		St. Helen's £7500		7 10 0	
		St.Helier's(Jersey)			
		St. Ives, Hunting.			
		St. Ives. Cornwall			
250	10	St. Neot's	10 0 0	8 0 0	12 0 0
		St. Peter's Port, (Guernsey)			
320	25	Salisbury	25 0 0	6 0 0	28 to 30
		Sandbach			
140	10	Saxmundham	10 0 0	5 0 0	10 0 0
		Scarborough			
		Seaham Harbour			
		Selby			
		Settle			
290	10	Sevenoaks	10 0 0	5 0 0	10 0 0
5400	25	*Sheffield United*	24 0 0	8 6 8	35 0 0
		Shelton, Potteries (see Brit. Prov.)			
		Shepton Mallet			
		Sherborne			
2914	5	Shields : Tynemth.	5 0 0	3 0 0	5 0 0
		Shields (South)			
		Shiffnal, Salop			
1000	5	*Shipley*	5 0 0	6 0 0	5 12 6
		Shipston-on-Stour			
		Shoreham			
		Shrewsbury £10,000		7 0 0	
400	10	Skipton	10 0 0	4 0 0	11 0 0
		Sleaford			
250	10	Slough	10 0 0		
		Snaith			
		Soham			
		Southwold			
1000	50	*Southampton*	32 0 0	5 0 0	
		Sowerby, Yorksh.			
		Stretford			
		Stokesly			
		Stafford £10,000		5 0 0	
		Staines and Egham			
		Staley Bridge £15,000		10 0 0	
		Stamford £11,250		3 0 0	
		Stockton-on-Tees £7980		9 5 0	
840	9½	Stockton, New	9 10 0	9 0 0	8 0 0
960	10	Stoke-upon-Trent	10 0 0	5 10 0	10 0 0
500	10	„ new shares	4 0 0	5 10 0	10 0 0
		Stone, Stafford			
		Stoney Stratford			
		Stourbridge			
		Stowmarket			
150	20	Stratford-on-Avon	20 0 0	7 10 0	30 0 0
		Stroud			
169	10	Swaffham	10 0 0	5 0 0	5 10 0
		Swansea £9000			
		Sudbury			
		Sunderland, old			
6100	5	*Sunderland*, new	5 0 0		
		Sutton			
		Swindon			
		Sydenham			
2800	5	*Taunton*	5 0 0	None	2 10 0
		Tadcaster			
		Tamworth			
		Tavistock			
		Teignmouth			
		Tenbury			
		Tenby			
		Tenterden £2000		2 10 0	
		Tetbury, Gloster			
		Tewkesbury			
		Thame			
		Thetford			
		Thirsk			
		Thornbury			
		Thorne			
		Tiverton			
670	5	Todmorden	3 0 6		
		Torquay			
		Torrington, Devon			
		Totnes			
		Totnes and Bridgetown Consumers			
4000	5	Tottenham	3 10 0	6 0 0	3 0 0
		Towcester			
200	10	Tring	10 0 0	5 0 0	10 0 0
		Trowbridge (see British Provin.)			
75	50	Truro	50 0 0	2 0 0	
		Tunbridge			
		Tunbridge Wells			
		Ulverston			
		Uppingham			
240	5	Upton-on-Severn	5 0 0	5 0 0	5 0 0
		Usk, Monmouth			
		Uttoxeter			
		Uxbridge			
1000	25	*Wakefield*, old capl	25 0 0	6 0 0	25 0 0
1600	5	„ new „	5 0 0	6 0 0	5 0 0
300	10	Wallingford	10 0 0	5 0 0	8 0 0
		Wandsworth			
		Wantage			
		Warrington £23304		10 0 0	
100	10	Wareham	10 0 0	3 10 0	8 0 0
120	25	Warminster	25 0 0	5 0 0	27 0 0
		Warth			
		Warwick £15,000		6 0 0	
		Watford			
		Welchpool, Mntgy.			
		Wellingborough			
		Wellington, Salop			
		Wellington, Smrst.			
		Wells, Smrst. £5000		7 10 0	
		Westbury			
		Weston-sup.-Mare			
2000	5	West Ham	5 0 0	6 0 0	5 0 0
		Whitby			
		Whitehaven			
		Whitstable			
		Whittlesea			
		Wigan £10,160		10 0 0	
		Willenhall			
		Winchelsea			
		Winslow			
240	10	Wimborne Minster	10 0 0		
		Wincanton			
360	50	Winchester	50 0 0	6 0 0	
900	12½	Windsor	12 10 0	10 0 0	23 0 0
		Witham			
		Witney			
4448	10	*Wolverhampton*	10 0 0	7 0 0	15 0 0
		Woburn			
210	10	Wokingham	10 0 0		10 0 0
		Woodbridge			
		Wooler			
		Wotton-un.-Edge			
		Worcester £29,000		8 0 0	
		Workington			
		Worksop and Radford			
		Wirksworth			
		Worthing			
		Wrexham			
		Woolwich			
		Woolwich Consms.			
		Woolwich (North)			
		Wymondham			
		Yarm			
795	20	Yarmouth	20 0 0		15½ to 16½
		Yeadon, near Leeds			
		Yeovil			
		York Untd. £55,000		7 0 0	
		SCOTLAND.			
	5	Aberdeen	3 10 0		3 12 0
		Airdrie			
		Alloa			
		Annan			
		Anstruther			
		Ardrossan			
550	20	Arbroath	20 0 0	7 10 0	7 10 0
		Auchterarder			
750	2	Auchtermuchty	2 0 0	6 0 0	2 10 0
		Ayr, old			
		Ditto, new			
		Banff			
		Barrhead			
		Bathgate			
		Beith			
		Bervie			
		Biggar			
		Blairgowrie			
350	6	Borrowstowness	6 0 0	5 0 0	8 0 0
		Brechin			
		Bridge of Allan			
	2	Broughty Ferry	2 0 0	5 0 0	2 0 0
		Burntisland			
		Calen			
		Campbelton			
		Clackmannan			
		Coatbridge			
		Coldstream			
		Collinsburgh			
		Crieff			
		Crail, Fife			
		Cumbernauld			
		Cumnock			
600	5	Cupar Angus	5 0 0	6 0 0	5 10 0
250	10	Cupar Fife	10 0 0	7 10 0	14 0 0
		Dalkeith			
		Dingwall			
		Dornoch			
		Douglas			
		Dumbarton			
400	20	Dumfries	14 0 0	5 0 0	20 0 0
		Dunbar			
		Dunblane			
	23¾	*Dundee*, old £29,687	23 15 0	8 8 0	30 10 0

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
	5	*Dundee*, nw £33,851	5 0 0	2 10 0	4 0 0
860	10	Dunfermline	10 0 0	6 0 0	12 12 0
		Dunkeld			
		Dunse			
		Dysart			
6000	25	*Edinburgh Gas Co.*	25 0 0	10 0 0	52 10 0
	25	„ *and Leith Co.* £98,640	18 0 0	7 10 0	27 13 6
		Elie			
		Elgin			
		Falkirk, old			
		„ new			
		Falkland			
		Ferry Port on Craig			
		Fochabers			
		Forfar			
		Fort William			
		Fraserburgh			
		Galashiels			
		Garlieston			
		Gatehouse n. Fleet			
		Girvan			
	25	*Glasgow* £122,500	25 0 0	10 0 0	50 0 0
15000	10	*Glasgow City and Suburban*	9 0 0	7 15 0	15 12 0
		Grangemouth			
		Grahamston			
		Haddington			
		Hamilton £7500		8 0 0	
		Hawick			
		Helensburgh			
		Huntly			
		Inverary			
400	1	Inverkeithing	1 0 0	5 0 0	1 0 0
1200	10	*Inverness Gas and Water*	10 0 0	5 10 0	15 0 0
2400	5	„ new shares	1 5 0	5 10 0	2 5 0
		Irvine			
		Jedburgh			
		Johnstone, near Paisley			
		Keith			
		Kelso			
		Kilmarnock			
		Kincardine			
		Kinghorn			
		Kingskittle, Fife			
		Kinross			
		Kirkaldy			
320	5	Kirkcudbright	5 0 0	5 0 0	5 0 0
1000	3	Kirkintulloch, near Glasgow	3 0 0	5 0 0	3 0 0
227	5	Kirkwall	5 0 0	5 0 0	4 10 0
518	5	Kirriemuir	5 0 0	6 0 0	
		Lanark			
		Largo, near Leven			
		Largs			
		Lasswade, n. Edin.			
		Lauder			
		Leith			
		Leslie, Fife			
		Lesmahago			
		Leven			
		Linlithgow			
		Linton, n. Nobleh.			
		Lochee, n. Dundee			
		Lochgilphead			
		Lochwinnock, near Paisley			
1200	1	Markineh	1 0 0	7 10 0	1 5 0
		Mauchline			
		Maxwell-town, n. Dumfries			
		Maybole, Ayrshire			
		Maryhill, near Glasgow			
		Melrose			
718	2	Mid & East Calder	2 0 0		2 0 0
192	5	Moffat	5 0 0		
	13½	Montrose	13 10 0	7 11 1	
		Musselburgh			
		Nairn			
		Neilston, n. Glasg.			
		Newmills, near Kilmarnock			
		Newburgh, Fife			
		Newton-on-Aye			
		Newton Stewart			
		North Berwick, n. Haddington			
		North Queensferry			
		Oban			
800	25	Peebles			
		Perth	25 0 0	4 16 0	22 10 0
5		„ new	5 0 0		1 17 6
		Peterhead			
		Pittenweem			
		Pollokshaws, near Glasgow			
		Port Glasgow			
		Portobello, n. Edin.			
		Prestonpans			
		Rutherglen, near Glasgow			
		Renfrew, n. Paisley			
		Saltcoats			
		Sanquhar			
		Selkirk			
		South Queensferry			
		St. Andrew's			
		Stewarton			
		Stirling			
		Stoneheavn			
		Stonhouse, Lanrks.			
		Stornoway			
		Stranraer			
		Strathaven, near Hamilton			
		Thurso			
800	1	Tillicoultry, n. Allon			
		Tranent	1 0 0		1 0 0
		Troon			
		Wick			
		Wigton			
		Wemyss	4 10 0		
		IRELAND.			
300	10	Armagh	10 0 0	8 0 0	14 10 0
		Ballinasloe			
700	50	*Belfast*	50 0 0		
		Ballymena			
		Ballymoney			
		Carrickfergus			
		Carlow, new			
		Cork (see Un. Gen.)			
1300	5	Clonmel Consumrs	5 0 0	5 0 0	5 0 0
		Drogheda			
19,000	10	*Dublin Consumers*	5 0 0	7 0 0	6 0 0
		Dublin Hibernian (see United Gen.)			
160	25	Dundalk	25 0 0		22 0 0
		Dungannon			
1000	5	*Downpatrick*	5 0 0		
		Enniskillen			
		Galway			
400	10	Kilkenny	10 0 0	8 0 0	11 5 0
		Larne			
		Limerick (see U. G.)			
1725	5	Limerick Consum.	5 0 0	5 0 0	5 0 0
600	15	Londonderry	15 0 0	6 13 4	21 10 0
500	7	Lisburn	7 0 0	6 5 0	7 0 0
520	10	Lurgan	6 0 0	6 0 0	6 0 0
		Mallow			
		Monaghan			
		Nenagh			
418	5	Newtownards	5 0 0	4 0 0	5 0 0
		New Ross			
		Newry			
		Omagh			
125	20	Portadown	20 0 0	6 0 0	20 0 0
600	10	Sligo	10 0 0		
		Tipperary			
		Tralee			
		Waterford			
		Wexford			

The Gas Works in the undermentioned towns belong to private individuals:—

Abergavenny.	Ely.	Hertford.	Morpeth.	Sheerness.	Ware. (2 works)
Bridgenorth.	Farsley.	Holt.	Oswestry.	Sidmouth.	Wem.
Carlow, old.	Gainsborough.	Huntingdon.	Peterborough.	Sittingbourne.	Weymouth.
Carnarvon.	Goole.	Hyde (Cheshire)	Pontypool.	Spalding.	Whitchurch (Salop).
Deal.	Harleston.	Kingston-on-Thames.	St. Alban's.	Waltham Abbey.	Wisbeach.
Diss.	Hatfield.	Lynn.	Sandwich.		

The Gas Works belong to the Corporations, or to Commissioners acting under special acts of Parliament, in the following towns:—

Carlisle.	Keighly.	Milton (Kent).	Rothesay.	Southport (Lanc.)	Walsall.
Cashel.	Knaresborough.	Paisley.	Richmond (Yorkshire).	Stockport	Wells (Norfolk).
Coleraine.	Lytham (Lanc.)	Rochdale.	Salford.	Strabane.	Youghall.
Greenock.	Manchester.				

Price Current.

The following List of Prices is corrected by an eminent wholesale house in each trade up to the latest period:—

CASTINGS, per Ton.

Average Weight of Cast Iron Pipes, per Yard.

1½ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow	Newcastle.	Wales.	Yorksh., Derbysh., and Staffrdsh.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1	3 7 6	2 10 0	3 0 0	3 15 0	3 10 0
1¼ and 2 inches Socket Pipes	6 0 0	5 0 0	5 10 0	5 15 0	5 15 0
2½ and 3 do. do.	5 17 6	4 17 6	5 7 6	5 12 6	5 12 6
4 and 5 do. do.	5 15 0	4 15 0	5 5 0	5 10 0	5 10 0
6 inches and upwards do.	5 12 6	4 15 0	5 2 6	5 7 6	5 7 6
Extra for bends, branches, and connection	2 0 0	2 0 0	2 0 0	2 0 0	2 0 0
Retorts, 1st fusion	5 5 0	..	..	4 17 6	5 0 0
Do. 2nd fusion	5 15 0	4 10 0	4 17 6	5 5 0	5 5 0
Tank Plates, ⅛ thick and above	5 10 0	4 17 6	5 0 0	5 7 6	5 17 6
Do. less than ⅛	5 15 0	5 0 0	5 0 0	..	5 10 0
Plain Castings ex. models	5 15 0	5 0 0	5 0 0	5 10 0	5 10 0

COALS.

NEWCASTLE. Unscreened.	s.	d.		DERBYSHIRE. Unscreened.	s.	d.	
Burnhope	5	3	per ton.	Clay Cross, Deep Main, and New Birchwood	6	6	per ton.
Ravensworth Pelaw	5	9	„	SCOTCH CANNEL.			
Dean's Primrose				Boghead	23	0	„
Pelton	6	0	„	Kirkness best	23	0	„
Brancepeth				Capeldrae, first quality	20	0	„
Medomsley				Ditto, second quality	10	0	„
Pelaw	6	3	„	Lothian	18	0	„
Eighton Moor	6	6	„	Lesmahago at Glasgow	16	6	„
Felling Main				Ditto at Leith	18	0	„
New Pelton				Arniston	16	0	„
Peareth				Wemyss	15	0	„
South Pelaw				Donibristle	10	6	„
Waldridge				Bridgeness	11	0	„
Washington Hutton				Kinneil			
South Peareth				Lochgelly	9	6	„
Ramsay's Cannel	12	0	„	Lumphinan			
Cowen's Cannel	12	0	„				

FIRE GOODS.

Best Bricks, 50s. per 1000, at Neweastle.
Do. Clay, 12s. per ton do.

LEAD.

Soft pig, £18. 10s. per ton.

WROUGHT IRON TUBING, subject to 40 per cent. Discount.

	2 inches.	1½ inch.	1¼ inch.	1 inch.	¾ inch.	½ inch.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent welded tubes, from 2 to 12 feet, per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto „ 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting pieces, or long screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, springs, and elbows, wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing sockets, caps, plugs, and nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain sockets	1 0	0 8	0 7	0 5	0 4	0 3
Flanches	1 9	1 6	1 3	1 0	0 9	
Syphons, 2 quart	15 0	14 0	13 6	13 0	12 0	
Ditto 1 quart	11 6	10 6	10 3	10 0	9 6	

FREIGHTS, per Ton.

Coastwise—Newcastle.	s.	d.		s.	d.
Chatham & Roches.	5	6	Weymouth	6	9
Cork	8	0	Yarmouth	4	6
Dover	6	0	*Foreign.*		
Dublin	8	0	Amsterdam	8	0
Exeter Quay	7	9	Boulogne	6	9
Folkestone	6	0	Barcelona	16	0
Hastings	7	6	Bordeaux	10	9
Ipswich	5	0	Calais	6	9
Jersey	7	0	Dieppe	7	0
London	5	3	Hamburg	7	0
Lowestoft	4	0	Havre	8	0
Lynn	5	0	Lisbon	10	6
Margate	6	0	Rotterdam	7	3
Portsmouth	7	0	Rouen	10	0
Plymouth	6	6	St. Petersburgh	9	6
Southampton	6	3	Stettin	9	0
			Trieste and Venice	16	6